

Revised Terms of Chicago Refrigeration Code

(Concluded from Page 1, Column 1)
Inspection of Steam Boilers, Unfired Pressure Vessels, and Cooling Plants, however, are prepared to back the measure as it now stands. Under the proposed ordinance, the department is given broad powers to interpret its provisions and to make rules in the future without approval of any other municipal agency.

Gerald Gearon, supervising mechanical engineer of the department, said that he anticipated no difficulty as a result of the public hearing. The ordinance was put up for passage without hearing, he said, because it had been discussed in engineering circles for a year, and had been published in mimeographed form as well as in technical papers.

GEARON IS CONFIDENT

Present protests, Mr. Gearon said, are the result of misinterpretation by some men of certain sections of the code. He expressed confidence that these matters would be set straight at the public hearing, and that the measure would be passed without changes.

The Cook County Retail Council's opposition to the ordinance, Mr. Knoop said, is based on the opinion of several of its members that certain provisions of the measure should be modified. He did not specify what section or sections of the ordinance were objected to.

The ordinance as originally drawn was submitted to the building codes sub-committee of the Chicago City Council in April, 1936, and was published in full in the April 29, 1936, issue of REFRIGERATION NEWS.

In its present form, the proposed code differs from the one originally presented in the following respects:

Direct systems of refrigeration using carbon dioxide as refrigerant may be installed in retail stores, restaurants, wholesale stores, beauty and barber shops, offices, sales rooms, manufacturing spaces, and like occupancies, but are limited in refrigerant content to not more than 1 lb. to each 50 cu. ft. by volume of total space, and the total refrigerant content in such systems shall not exceed 2,000 lbs.

Systems containing Class 2 non-irritant and non-flammable refrigerants (the Freon group) may not be located in a space in which there is apparatus to produce an open flame, unless the apparatus for producing the open flame is vented so as to carry the products of decomposition to the outside atmosphere.

Flames made by matches, cigarette lighters, alcohol lamps, and similar devices are not considered as open flames.

RESTRICT APARTMENT JOBS

In the section covering multiple dwelling systems, it is provided that no such system may contain more than 50 lbs. of sulphur dioxide, 50 lbs. of methyl chloride, or 100 lbs. of a Class 1 or 2 non-flammable refrigerant (carbon dioxide or the Freon group). All other refrigerants listed in the refrigerant classification section of the code are prohibited in this type of installation.

Shut-off valves for multiple dwelling systems are to be installed (1) In each branch liquid and suction line at or near the compressor, (2) At the bottom of each riser or manifold connection of any riser or any branch connecting manifold extending over 40 feet in length.

In air-conditioning installations, direct systems using carbon dioxide may not use more than 1 lb. for each 100 cu. ft. of volume in total space to be cooled, and the total refrigerant content may not exceed 2,000 lbs.

Tests are to be made of coils and coolers used in direct systems (one and one-half times the pressure specified, in the case of Freon refrigerants), but the department may accept from the manufacturer a report of a similar test made by him at the place of manufacture, instead of conducting all such tests itself.

LEAK ALARM PROVISION

That section of the original code which provided for a leak alarm device in all direct systems containing more than 20 lbs. of Class 2 non-irritant and non-flammable refrigerant has been changed to read as follows:

"In every refrigerating system containing more than 25 lbs. of Class 2 non-irritant and non-flammable refrigerant there shall be provided a single level signal device or such other means as will produce a signal sufficient to attract the attention of the person or persons responsible for the operation of such equipment, in case of refrigerant loss from the refrigerating system during operation of a pre-determined amount according to the following schedule:

"Less than 8-ton capacity (air-conditioning rating)—10 lbs.
"Eight to 15-ton capacity (air-conditioning rating)—15 lbs.

"Above 15-ton capacity (air-conditioning rating)—permissible loss shall not exceed 15 lbs. plus 1 lb. for each ton capacity of the system in excess of 15 tons."

Where evaporators are located in apartment or hotel rooms used for sleeping purposes, or in ducts leading thereto, systems are limited to 50 lbs. of Class 1 or 2 non-irritant and non-flammable refrigerant, "provided that the total refrigerant content of the system shall not exceed 1 lb. for each 100 cu. ft. of volume in total space to be cooled."

Unit coolers serving one room may be used, provided that where an irritant or flammable refrigerant is used the number of workmen shall not exceed one for each 150 sq. ft. of floor area on the floors above the first, or ground level.

Apartment building indirect systems may not contain more than 350 lbs. of a Class 2 non-irritant and non-flammable refrigerant, and where the system contains more than 100 lbs. of refrigerant the refrigerant-containing parts must be placed in a machinery room with

tight-fitting, self-closing doors, and with natural or mechanical ventilation directly to the outside.

An important addition to the original code has been made in the section on unit air-conditioning systems. The definition of such systems has been revised to read: "A system which can be removed from the user's premises without disconnecting any refrigerant containing parts, water connections, or fixed electrical connections, and which does not contain more than 6 lbs. of any refrigerant."

Unit systems containing an irritant or flammable refrigerant may not be placed in:

"Wards or private rooms of hospitals, sleeping quarters of asylums, cell blocks of prisons, or any place where people are confined or helpless.

"Places of public assembly, for example auditoriums, dance halls, theaters, exhibition halls, schools (except laboratories for teaching refrigeration), court houses, churches, entrances and exits of public buildings, entrances and exits of factory buildings with only one exit.

"Sleeping rooms of residences, hotels, or apartment buildings."

RESTRAINING PROVISIONS

Unit systems containing not more than 6 lbs. of a non-irritant and non-flammable refrigerant may be installed in any location, the ordinance provides. Unit systems containing more than 6 lbs. of such refrigerant may be installed anywhere except in wards or private rooms of hospitals, sleeping quarters of asylums, or any place where people are confined or helpless.

Where the low pressure side of Class "A" systems (those containing

1,000 lbs. or more of refrigerant) is protected by a safety valve, the test pressure shall be twice the pressure at which the safety valve is set.

The "safety devices" section of the code has been altered slightly to require the inclusion of a vent to the outside atmosphere on systems using more than 100 but less than 1,000 lbs. of a Class 1 non-irritant and non-flammable refrigerant; on systems using more than 6 but not more than 20 lbs. of a Class 2 non-irritant and non-flammable refrigerant; and on systems of any size using a flammable or irritant refrigerant.

Emergency relief valves must be provided on Class "A" systems using carbon dioxide (1,000 lbs. or more), and on Class "A" and "B" systems using other types of refrigerants (100 lbs. or more).

Where a hand-operated relief valve is used, the code provides that it shall be of 2-inch diameter, for

Class "B" systems, and 3-inch diameter for Class "A" systems. Such valves shall be connected to the low pressure side of the system, and arranged or located so that they may be operated outside of the entrance to the machinery room.

"Every system which may be charged after installation shall have the charging connection located on its low pressure side," the code provides. "No container shall be left connected to a system except while charging refrigerant."

"The containers from which refrigerants are discharged into or withdrawn from a refrigerating system shall not be filled in excess of 60% of the total volume of container or vessel. No refrigerant shall be transferred from one container or vessel to another that will fill refrigerant is being transferred in the container or vessel to which excess of 60% of the liquid capacity of container or vessel."



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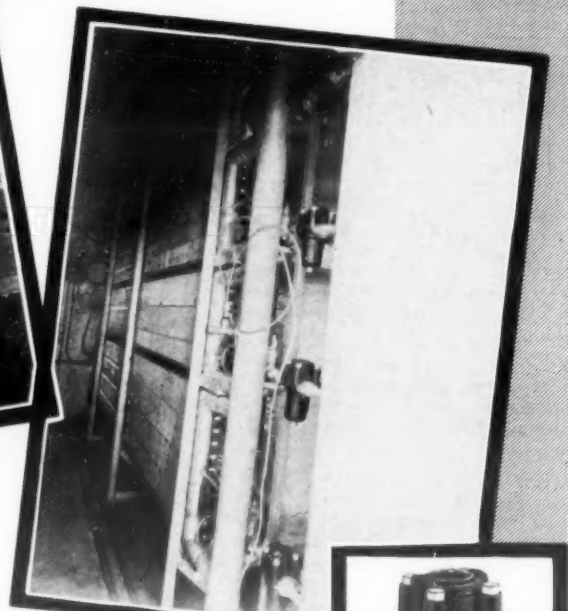
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Section of Air Conditioning Unit showing A-P Solenoids and Expansion Valves. Installed by Frigidaire Division, General Motors Sales Corp., Los Angeles. Consulting Engineer: E. L. Ellingwood, Los Angeles.

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Trade-in Limits Fixed by Topeka Electric League

New Group Lists Four Benefits of Dealer Organization

TOPEKA, Kan.—Although organized only this summer, the Electric League of Topeka already has made itself felt as a force for more profitable refrigerator and home appliance merchandising, according to Secretary Ross Hill.

Four definite gains, Mr. Hill says, have been accomplished through the League:

1. Wild trade-in allowances have been eliminated, a maximum limit of \$10 having been established and preserved.
2. No home demonstrations are given, and no trade-ins allowed, on radios selling under \$30.
3. No firm is permitted to advertise "No Down Payments."
4. Small non-member firms have been lined up on these practices through the influence of League member firms, handling the same brand of merchandise, with the manufacturer.

Dealers have been given a chance to increase their profits through cleaner deals, Mr. Hill says. The League's grievance committee of three members and the secretary handles all complaints.

Luncheon meetings are held every third Tuesday, and the open interchange of problems thus afforded has been a moving factor in killing bad selling practices, Mr. Hill believes.

Kelvinator Shifts Personnel In Air-Conditioning Dept.

DETROIT—Three major changes in Kelvinator's commercial sales personnel have been announced by J. A. Harlan, commercial manager for Kelvinator Division of Nash-Kelvinator Corp.

Part of the commercial territory previously directed from the New York City office will be assigned to a new division, headquarters of which will be announced later. This division will be managed by L. T. M. Ralston, New York divisional manager.

Mr. Ralston became associated with the Kelvinator air-conditioning department in March of last year, after previous experience as consultant.

(Concluded on Page 2, Column 3)

Air-Conditioning Exports Up 89% For Six Months

WASHINGTON, D. C.—January-through-June export sales of American air-conditioning equipment this year rose 89% over sales during the first half of 1936 to reach a new six-month high of \$794,756, according to the machinery division of the U. S. Department of Commerce.

The Union of South Africa and Argentina proved to be the United States' best foreign air-conditioning customers during the first six months of 1937.

January-June air-conditioning exports for 1936 totaled \$421,452. Air-conditioning exports for the entire year of 1936 totaled \$883,432.

Most substantial foreign air-conditioning business, according to commerce department reports, is in

(Concluded on Page 2, Column 1)

July Commercial Sales Shade under 1936

DETROIT—July world sales of commercial refrigerating units by members of the Commercial Refrigeration Section of the Refrigeration Division of National Electrical Manufacturers Association to distributing outlets totaled 25,008 units, a shade under last July's total of 25,566 units, which was an all-time record for the month.

In June of this year the Nema members reported a total of 33,643 commercial condensing units sold to distributing outlets.

Sales of self-contained air conditioners held up well in July, a total of 1,001 such units being sold. Water coolers, ice cream cabinets, and bottled beverage cooler sales also held up the rapid pace set on these items in previous months this year.

The tabulation of Nema commercial refrigerating unit sales will be found on page 16 of this issue.

Spare-Time Radio Psychologist Puts His Hobby To Work When Selling Refrigerators

MERIDEN, Conn.—Walden M. Powell of Powell Bros., Leonard refrigerator dealer here, is making his knowledge of general psychology do a double job.

In the first place, he is finding it a great aid in closing sales; and secondly, after business hours, he is helping to solve the problems of others in his role of "The Old Counselor" over radio station WELI, New

Norge Building Ranges at New Muskegon Unit

New Construction Boosts Capacity on Appliances To 3,500 Units Daily

MUSKEGON, Mich.—Construction of a complete new electric and gas range plant here, and the transfer of machinery and equipment from the Detroit plant with a production interim of less than 30 days, has been effected by Norge division of Borg-Warner Corp. under the supervision of C. D. Donaven, vice president and general manager.

Within 60 days of the completion of the new Muskegon plant, production of Norge ranges has exceeded the normal Detroit production by more than 100%, it is claimed.

The company's Muskegon manufacturing facilities now include 28 acres of plant ground and 721,295 sq. ft. of floor area. Peak employment is 4,500. Electricity is consumed at the rate of 1,500,000 kwh. per month. Five boilers produce 2,100 hp.

Power conveyor line, both slat and overhead, is 4.6 miles long, and the

(Concluded on Page 2, Column 3)

Frigidaire Producing Electric Range Line

DAYTON—Frigidaire division of General Motors Corp. last week went into production on a line of newly developed electric ranges, to be marketed nationally as an auxiliary to its electric refrigerators.

Manufacture of electric ranges, national introduction of which will be made later this year, marks the beginning of an expansion program of General Motors in the home appliance field, Frigidaire men said.

(Concluded on Page 2, Column 5)

Attention!



Verne Calkins, shown in action above, will assist Vice President Judson Sayre in conducting the first Bendix Home Appliances distributors meeting in South Bend next week.

New Electromaster Range Features 4 Built-in Kettles

DETROIT—An electric range model in which the usual surface type heating units are replaced by four built-in aluminum kettles has been placed on the market by Electromaster, Inc. here.

The kettles, known as "Vita-Misers," are in four different sizes to handle all types of cooking requirements. Origin of the idea is credited to Walter C. Ayers, Electromaster sales manager. Advantages claimed for this type of cooking unit are:

1. Economy of operation, since all

(Concluded on Page 12, Column 5)

Silliman Heads Detrola Appliance Sales

DETROIT—Horace H. Silliman has been appointed director of sales for the Detrola Corp., according to an announcement recently made by John J. Ross, president.

Mr. Silliman's appointment comes in connection with the announcement by Detrola of a new merchandising policy, under which a nationwide organization of distributors

(Concluded on Page 20, Column 4)

'Electric Cold in Every Kitchen' Is Nema Theme

Cooperative Drive Under Nema Sponsorship Opens in 2 Cities

OKLAHOMA CITY—Emphasizing the theme, "In every kitchen with electric light there should be electric cold," the cooperative promotion campaign on electric refrigerators sponsored by the members of the Household Refrigeration Section of the Refrigeration Division of National Electrical Manufacturers Association (Nema), opened here Sept. 1, and is scheduled to continue for six weeks.

A similar campaign was inaugurated in Dallas at the same time. It is believed that these two campaigns will be used to test methods and results preparatory to a campaign of national scope to be put into effect at the start of the next season.

Newspaper and billboard advertisements are carrying the message to the public. Say the advertisements: "An electric refrigerator is so safe . . . so swift . . . so simple." The body of the copy in one advertisement stated:

"An electric refrigerator will give you greater peace of mind, because you will know the food you save your family has been kept safe. It will give you greater pleasure, for it will freeze faster than any other type of refrigeration—providing plenty of ice cubes and producing

(Concluded on Page 2, Column 2)

Faulstich Chief Grunow Refrigerator Engineer

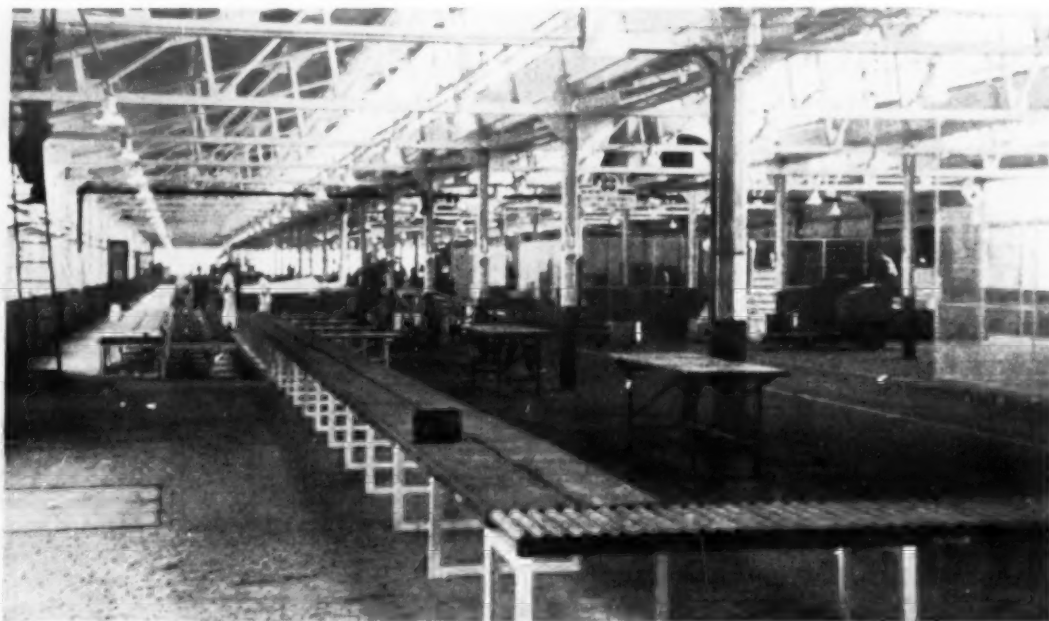
CHICAGO—Appointment of Henry W. Faulstich as chief of General Household Utilities Co.'s refrigerator engineering staff has been announced by the company.

Mr. Faulstich has been with the Grunow organization since 1932 when he was placed in charge of cabinet inspection at Detroit. Later he was chief inspector of the company's Crawford Ave. plant here, and more recently acted as service manager.

Before joining the Grunow organization Mr. Faulstich had spent two years working on powdered fuel combustion and pipe line distribution for public utilities.

(Concluded on Page 2, Column 2)

First Pictures of New Bendix Home Laundry Plant in South Bend



Production of Bendix washing machines, new product of radically different design in the home laundry field, will get under way by the end of this month. These pictures, taken in the factory by the editor, are the first to be published since Bendix announced its entry into the home appliance field.

Air-Conditioning Sales To Argentina & South Africa Rise Sharply

(Concluded from Page 1, Column 2) industrial and commercial equipment. Residential trade has progressed much more slowly, owing primarily to the low purchasing power of the average family in many foreign countries.

Six-month exports to Union of South Africa and Argentina this year totaled \$84,544 and \$84,474 respectively, compared with totals of \$40,487 and \$75,278 for the first six months of 1936. The demand for air-conditioning equipment in the Union of South Africa has increased rapidly since conditioning systems first were installed in that country's gold mines several years ago. Sales to that market totaled \$9,561 in 1935, and \$85,863 last year. Most of the Argentina business is confined to installations in Buenos Aires.

Substantial sales increases were recorded on many other markets besides South Africa and Argentina. These increases, compared to sales during the first half of 1936, follow:

Canada, \$68,414 against \$58,782; Brazil, \$63,650 against \$36,317; United Kingdom, \$59,050 against \$31,050; China, \$45,133 against \$21,432; Philippine Islands, \$43,374 against \$6,715; Japan, \$43,242 against \$4,738; Soviet Russia, \$44,524 against \$11,776; Mexico, \$31,708 against \$14,886; France, \$30,475 against \$15,008; British India, \$26,137 against \$11,186; Egypt, \$26,001 against \$661; Netherland India, \$29,583 against \$5,016; Hawaii, \$45,244 against \$34,332.

Oklahoma City Begins Cooperative Promotion

(Concluded from Page 1, Column 5) dainty frozen salads and desserts in record time. And it will give you these advantages, plus many more, so economically that you can't afford to be without it . . . for the modern electric refrigerator actually saves much more than it costs.

"See the new electric refrigerators today. Their beautiful lines and gleaming finishes will make a new room of your kitchen. Their roomy, inviting interiors will prove a constant joy. And you will be just as pleased at the low prices and convenient terms as you are at the amazing improvements and many new features you find in the new models. Consider every factor. Then do what over ten million families have already done . . . Buy an electric refrigerator."

Local dealers and the Oklahoma Gas & Electric Co., local power company, are taking an active part in the campaign.

Orner Heads Grunow Radio Engineering

(Concluded from Page 1, Column 5) General Household Utilities Co. also has announced appointment of Ralph J. Orner as chief radio engineer.

Mr. Orner's engineering experience commenced in 1930 when he joined DeForest Radio.

He later spent two years with U. S. Radio & Television Corp., now merged with Grunow.

Kelvinator Makes Shift In Conditioning Staff

(Concluded from Page 1, Column 1) ing engineer in New York City for the Chrysler building.

J. K. Knighton, formerly sales manager of the commercial air-conditioning division in Detroit, replaces Mr. Ralston in New York City as eastern sales manager of the commercial division. Mr. Knighton has had extensive experience in the commercial field, and since 1933 has been associated with Kelvinator.

H. M. McGaughey, until recently assistant sales manager of the commercial air-conditioning department in Detroit, has been promoted to the sales management of the department. Mr. McGaughey came to Kelvinator in 1930 after serving in managerial capacities with refrigeration concerns of Illinois and Indiana.

New Norge Range Plant Has Large Capacity

(Concluded from Page 1, Column 3) roller conveyor system is 17 miles long. Warehouse capacity is now sufficient to store 50,000 units.

The porcelain plant has five gas-fired box furnaces, two continuous electric ovens, and one continuous gas-fired oven 105 feet long, said to be longest in the world. The plant has a capacity of 100,000 sq. ft. of porcelain per day.

The recent improvements have increased Norge's production capacity to a total of 3,500 refrigerators, ranges, and washers per day, Mr. Donaven says.

Air Devices Co. Merges With Connecticut Firm

CHICAGO — Approval of the merger of Air Devices Corp., manufacturer of unit air conditioners, with Connecticut Telephone & Electric Corp. and removal of the company's general offices from Chicago to Meriden, Conn. was voted by directors of the organization at their meeting here last week.

Severance of Air Devices' association with the Bendix interests was seen with the resignation of Vincent Bendix as chairman of the board and director of the company. V. W. Klesrath and George C. Fleener also resigned from the board.

Hal P. Shearer, president of Connecticut Telephone & Electric Corp., was elected a director and vice president of Air Devices, and C. A. Cuneen was named treasurer and assistant secretary.

Parcaro Will Manage Penn's N. Y. Office

GOSHEN, Ind. — Appointment of M. Parcaro as manager of Penn Electric Switch Co.'s New York City office has been announced by R. H. Luscombe, sales manager.

Mr. Parcaro was connected with Carrier Engineering Corp., Newark, for 13 years prior to joining Penn. With Carrier, he was engaged in design and research work, and served for a number of years as control engineer for the Carrier organization. He was active in designing standard and special control systems for Carrier, in addition to designing special applications.

Dealer Sells 35 Units in 6 Months in Town of 7,000

NEGAUNEE, Mich. — Guizetti's Music Store, local Fairbanks-Morse dealer, sold and delivered 35 Conservador refrigerators before the middle of June, although the entire population of this little Upper Peninsula town is somewhat less than 7,000 persons.

TEMPRITE
INSTANTANEOUS
BEER AND WATER COOLERS
Detroit Michigan

Salesman Finds Profit & Relaxation in Radio Job

(Concluded from Page 1, Column 3) signature of refrigerator prospects on the dotted line," he declares. "A knowledge of the causes and corrections of fear, worry, inferiority complexes, and the like, gives the salesman a technical understanding of how to handle people who are prospects for or owners of electric refrigerators."

Pleasure derived through helping others solve some of their problems, as he does in his radio lectures, is repayment enough for his labors in learning psychology, Mr. Powell says. His education was acquired through home study, conditions at home during his youth making it impossible for him to compete a year of high school work.

"Some men go fishing to find relaxation from the pressure of modern



WALDEN M. POWELL

business life," he says. "I find the same compensation in preparing and delivering my radio talks."

Refrigerator salesmen may well spend some of their leisure moments investigating what the study of psychology can do for them, both in meeting their sales quotas and in making their lives more pleasant, Mr. Powell believes.

"I believe that if salesmen would acquire even a limited knowledge of general psychology, they would never have to worry about what is called 'sales psychology,'" he says.

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THIS MOTOR IS A SALESMAN that helps you convince prospects that your refrigerators are the best for the money and are of high quality throughout.

General Electric's high standards of quality are well known, and when prospects are told that your refrigerators are equipped with G-E motors, they take the high quality of the electric equipment for granted. This reputation, added to that of the refrigerator manufacturer, leaves no doubts in the minds of prospects about the dependability of the entire unit. Thus, more time can be devoted to talking about the superiority of electric refrigerators and how they save their cost in a few years.

Impartial surveys indicate that the general public prefers G-E motors—prefers them because they have a reputation for giving many years of care-free service.



THIS MOTOR IS A WORKMAN that is reliable, that is quiet-operating, and that requires little or no attention—one that make satisfied customers and leads to additional purchases of appliances, and brings in new customers.

G-E motors are designed by experienced engineers and built to last a long time. The cast-aluminum rotor winding, protected stator windings, automatic belt-tightener base, and resilient-rubber mounting are but a few of the many G-E developments made to meet the high performance standards of modern appliances.

Today, millions of G-E motors are giving lasting satisfaction on refrigerators, washing machines, oil burners, and stokers—are helping to build confidence in domestic electric appliances. General Electric, Schenectady, N.Y.

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94% of G-E Time Payment Sales Made to Lower-Income Families, Sweeney Declares In Report Minimizing Saturation Scare

CLEVELAND — Ninety-four per cent of the contracts written by General Electric Contracts Corp. (which finances G-E appliance installment sales) during the first half of 1936 were with families with incomes of less than \$2,000, A. M. Sweeney, manager of General Electric Co.'s appliance and merchandise sales division, declared in an address minimizing the bugaboo of saturation of the electric refrigerator market, made before the recent distributors convention held at Association Island.

The figure for families with incomes of \$1,000 or less was 72.9% of the total, according to the analysis made by the G-E Contracts Corp. The analysis did not cover contracts written by department stores, utilities, nor cash sales, which, taken together, represent approximately 45% of the company's total sales, Mr. Sweeney said.

"If we consider the total sales by these groups in the income bracket above the \$2,000 level," Mr. Sweeney said, "we still have approximately 50% of our sales in income brackets below \$2,000 right this year."

Referring to General Electric's coverage drive to add new outlets last spring, Mr. Sweeney said that 3,500 new dealers were added to the national distributing organization to increase the total number to 10,000.

Break-down of the total distributing organization, Mr. Sweeney said, was as follows:

	Per Cent
Utility stores	3,522 27.9
Electric specialty stores	2,140 23.7
Hardware stores	1,070 11.8
Furniture stores	742 8.2
Department stores	243 2.7
Miscellaneous	2,324 25.7
Total	9,041 100

How the total is divided in regard to location in metropolitan cities, semi-large cities, and small towns was indicated in the next table Mr. Sweeney quoted:

Cities 50,000 pop. and above.....	193
Cities covered	193
Number outlets	1,781
Average pop. per outlet.....	24,694
Average wired homes per outlet....	5,000
Total number of cities and towns ..	1,000
1,000 pop. and above.....	6,994
Total covered	4,429
Per cent coverage	63.3%
Number of display outlets.....	9,041
Average pop. per outlet.....	13,530
Average wired homes per outlet....	2,403

"In metropolitan cities our average coverage is one outlet for 25,000 population, whereas total U. S. coverage is one outlet per 13,000 population, according to the chart," Mr. Sweeney commented.

"While these metropolitan cities of 50,000 population and over represent approximately 36% of the total population of the United States, the coverage in number of outlets is only 20% of the total.

"Comparing our 15 districts as regards quota realization with their metropolitan coverage, it is indicated that the sales results almost without exception are directly proportionate to the number of dealers. The more retail outlets per thousand population or number of wired homes, the better the sales quota."

General Electric's refrigeration sales for the first six months of this year were 40% ahead of those last year, Mr. Sweeney said.

Discussing the present market possibilities, Mr. Sweeney said that the market is approximately 50% saturated, assuming the sale of 2,500,000 refrigerators by the end of 1937.

"This means that 11,500,000 mechanical refrigerators are yet to be sold to present wired homes, plus new wired homes, plus renewals."

Estimating this total according to family income groups and the per cent of each group which has not yet purchased electric refrigerators, Mr. Sweeney quoted the following figures:

	Wired Home Families	Unsold Families
Family-Income		
Less than \$1,000	6,600,000	3,300,000
\$1,200—\$2,000	9,200,000	4,500,000
\$2,000—\$3,000	4,600,000	2,200,000
\$3,000—\$5,000	1,900,000	1,000,000
Total	23,200,000	11,500,000

Citing as two other weighty factors the replacement market and

that opened up by rural electrification, Mr. Sweeney's plea was that those present "forget about saturation, and remember that the electric refrigerator is an over-the-counter appliance from a sales opportunity standpoint."

Mr. Sweeney said that with the elimination of retail sales organizations on the part of General Electric specialty appliance distributors, adequate dealer coverage in metropolitan areas has become increasingly important.

"One of the greatest hazards we face in increasing metropolitan dealer coverage is that we may add unethical dealers who will disrupt our entire setup," was the preface to Mr. Sweeney's plea that distributors maintain a high standard among dealers, and weed out unethical dealers now.

New Kelvinator Dealer Opens in Parsons, Kan.

PARSONS, Kan.—New dealership formed here recently to sell Kelvinator refrigerators, ABC washers, and RCA-Victor radios, is Leatherman's Universal Sales & Insulating Co.

Norman Wilson, head of sales promotion for Richards & Conover Hardware Co., Kelvinator distributor; Richard Lancaster, specialty sales manager of the distributing company, and Jack Black, ABC representative, conducted an afternoon and evening sales meeting for the dealership on July 29.

All-Electric Kitchen Installed In N. H. Restaurant

MANCHESTER, N. H.—Installation of an all-electric cooking, refrigeration, and water-heating system in the "New Pine Room" of a large restaurant, The Farm Kitchen, in Hooksett, has just been completed by the Public Service Co. of New Hampshire.

N. Y. Electrical Group To Admit Gas Dealers

NEW YORK CITY—At a recent meeting, members of the Electrical Association of New York voted to include gas interests in the membership, and to change the organization's name to the Electrical and Gas Association of New York, Inc. Interest of both industries in the same appliance lines and consequent common fields of interest was responsible for the change, according to C. E. Stephens, president of the association.

New Appliance Dealership to Operate in Minneapolis

MINNEAPOLIS — The Wilson Electric Co. will operate in connection with Bird Oil Burners, manufacturer of oil heating equipment, in its new general offices at 4345 France Ave. The Wilson firm will handle mechanical refrigerators and other household appliances.

Clawson Puts on 'Mart' For Evansville Group

EVANSVILLE, Ind.—R. E. Clawson, local merchandising supervisor of Westinghouse Electric & Mfg. Co., was in charge of the first annual "merchandise mart" held here Aug. 19 and 20 and attended by 200 dealers and salesmen from the tri-state area.

Guests included J. E. Hugo, central promotion manager, Mansfield; V. E. Freeland, department store supervisor, and J. J. Moffatt, merchandising manager, Westinghouse Electric Supply Co., Chicago. J. H. Richards is local Westinghouse manager.

G. T. Fake Joins Chaney Promotion Staff

SAN ANTONIO, Tex.—G. T. Fake, manager of the electrical appliance department of the Karotkin Furniture Co. for the past 11 years, has joined the sales promotion staff of The Ellis Chaney Co., Norge distributor in 52 counties.

Announcement

On December 1st of this year your
Grunow Distributor will display

Grunow

THERMENE

—the most amazing development
in refrigerator history... a companion
line to the popular electrically
powered Grunow models.

GENERAL HOUSEHOLD UTILITIES CO.
CHICAGO, ILLINOIS

CHILLED BY
THE FREEZING
FLAME

SPECIALTY SELLING IDEAS

'Use the Grocer' Display Plan Nets 21 Sales In 2 Weeks for 8 Dallas Norge Dealers

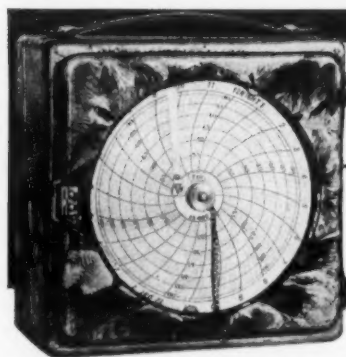
DALLAS—Eight grocers furnished leads for 21 sales which dealers of Texas Norge Sales Co., Norge distributor, closed during a two-week period recently.

Here is the outline of the "use the grocer" plan which resulted in these sales:

First, dealers contacted all of the better grocery stores in their respective localities. Arrangements were

then made with all of these stores having clean stocks and electrically refrigerated meat display cases to place a Norge refrigerator on display in the store. Accompanying these refrigerators were large display cards reading "Your grocer recommends Norge refrigeration to protect the foods you purchase here."

For each prospect resulting in sale of a Norge refrigerator, each grocer was paid \$5.



You need this
TAG MINIATURE RECORDER
In Selling or Servicing

A record of temperature is indispensable in checking the performance of refrigeration and air conditioning equipment. By a permanent written temperature record on a 4 1/2 inch chart, this small but precise Recorder assists in sales and service work. It is easy to carry, only 5 3/4" square by 4 1/4" deep and weighs less than 3 1/2 lbs. Write for Catalog No. 1136-25.

ASK YOUR JOBBER ABOUT TAG CONTROLS AND TEST EQUIPMENT

C. J. TAGLIABUE MFG. CO. 550 PARK AVE. B'KLYN-N.Y.

Kelvinator 'Two-in-One' Display Idea Wins Award For Easton, Pa. Dealers

DETROIT — For designing the Kelvinator "Two-in-one" display, two Easton, Pa. Kelvinator dealers have been awarded a special silver plaque by Henry W. Burritt, vice president in charge of sales for Kelvinator.

The award, won by William Titus and Robert Von Bulow of Titus & Von Bulow, will be duplicated from time to time when other outstanding sales ideas are contributed by members of the Kelvinator field organization.

Now on hundreds of showroom floors, and throughout the year a basic part in Kelvinator merchandising, the "Two-in-One" display shows one condensing unit doing the work for two cabinets.

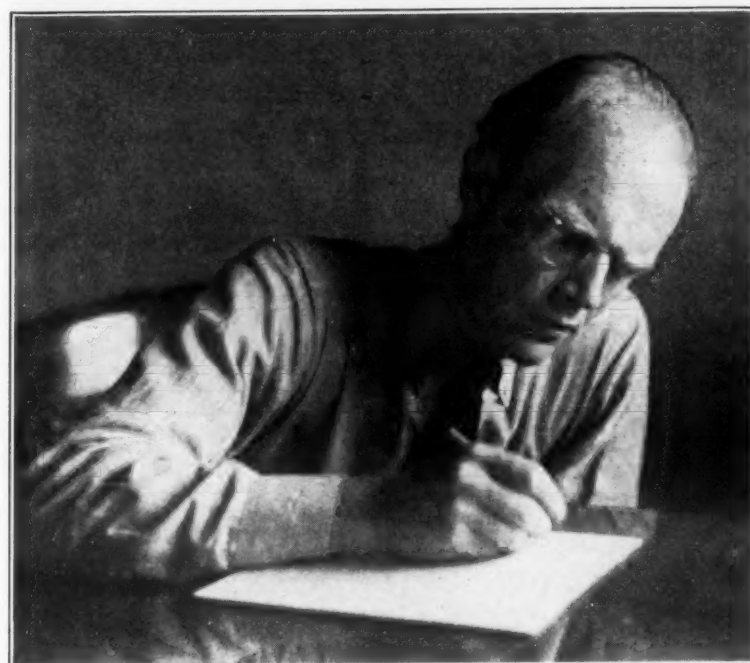
Found an effective sales closer, it illustrates Kelvinator's "Two-Facts" claim for its 1937 refrigerator.

1,911 Appliances Sold In San Antonio Drive

SAN ANTONIO, Tex.—In a recent home modernizing campaign featuring an eight-day exposition in the Municipal Auditorium, 1,911 gas and electrical appliances were sold by local dealers and the San Antonio Public Service Co.

Included in the sales were 512 electric refrigerators, two room coolers, six electric ranges, two electric water heaters, 193 washing machines, and 67 gas refrigerators.

Still on the Job



Art Scaife, advertising and sales promotion manager of General Electric Co., wants it known that he is still on the job in spite of the recent exodus of some headline executives from the Nela Park offices. Otherwise, this shot, taken by the News editor last week, might have been labelled "The Man from Mars."

Canvassing by Telephone Proves Worth While, Mt. Vernon, Ohio Salesman Affirms

MT. VERNON, Ohio — Averaging at least one good prospect to every 50 calls has convinced V. L. Phillips, veteran appliance salesman of Knecht & Feeney's, Westinghouse dealership here, that telephone canvassing is "definitely worth the time and trouble expended."

Salesman Phillips' present goal is to "sell 50 washers this year or bust." He's out to beat the store's 1936 laundry equipment record of 32 sales in this town of approximately 10,000 inhabitants.

There's no formula for successful

telephone canvassing, according to Mr. Phillips.

"You've got to develop your own technique," he says.

Although he agrees that some salesmen just aren't suited for telephone canvassing, Mr. Phillips declares that dislike of this prospect-getting method is usually due to unfamiliarity or lack of patience.

"Getting satisfied users to talk to their friends is the only better way of snagging prospects than going to the phone and doing it yourself," says Mr. Phillips.

White Austin 'Chariot' Helps Dealer Sell His 1936 Total in One Month in Virginia Towns

ONANCOCK, Va. — A white-enameled Austin coupe with refrigerator advertising on top, front, and back is the promotional chariot from which Howard S. Kilmon, Westinghouse dealer here, sold more refrigerators during one month recently than he sold during all of 1936.

The car is driven through every town in the dealer's territory once a week. The driver distributes West-

inghouse sales literature and souvenirs such as miniature rubber refrigerators, or "Built-in Watchman" flipper discs.

"We pick up new prospects each day and make a record of the names and addresses of people who ask for advertising material," said Mr. Kilmon. "On our next stop in the town we call on these prospects and ask if they saw our car and received one of our gifts the previous week."

"If the prospect hasn't received one, the salesman says: 'We're sorry we missed you. Here's one for you.' He gives her a Built-in Watchman disc, and asks if he can come in a moment and explain how it works."

"We seldom fail to get into a home when we use this approach," Mr. Kilmon added. Next step is to launch into a complete sales story, stressing the government Westinghouse order in meeting queries on current consumption. Strong salesmanship, after that, winds up the sale, Dealer Kilmon states.

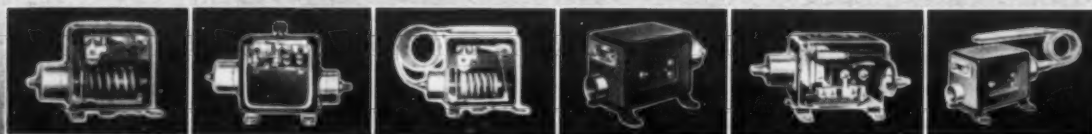
PENN MEN Serve You from Here



Management, research and production facilities of Penn Electric Switch Co. are now centrally located at Goshen, Indiana.

Growth in man power...growth in physical plant...to better serve you in your refrigeration control problems—are represented in the recent move to our new completely air-conditioned offices, laboratories and factory at Goshen, Indiana. Here an enlarged staff of men—seasoned by broad technical training, extensive field experience and sound production methods—constantly analyzes refrigeration control problems to bring you simplified, dependable, more efficient controls. Come for a visit to this new laboratory and factory—and bring your control problems with you. Or, write or phone our nearest branch office, representative or distributor.

PENN REFRIGERATION CONTROLS LEAD THE INDUSTRY IN STAMINA AND VARIETY OF APPLICATION



Type L Model LP Low Side Pressure Control Type LSC Model LSCP Dual Pressure Control With Thermal Overload Type L Model LT Temperature Control Type 203 Low Side Pressure Control Type 209 Dual Pressure Control—With Thermal Overload Type 213 Temperature Control

Our reputation for unfailing refrigeration control devices was founded on the world famous Penn Type L line pictured above.

The new "200 Line" of controls shown above met mass production problems of national manufacturers seeking short cuts in costs.

PENN ELECTRIC SWITCH CO.

OFFICES: New York, Boston, Detroit, Dayton, Molina, Chicago. EXPORT: 100 Varick St., N. Y. C. Distributors in Principal Cities. REPRESENTATIVES: Garland-Affolter Engr. Corp., San Francisco, Seattle, Portland, Los Angeles; Forslund Pump and Machinery Co., Kansas City; The Uhl Co., Minneapolis; Jules Bencke, St. Louis; Monarch Sales, Denver.

Now located in GOSHEN, INDIANA

BRUNNER

Send for the New REFRIGERATION CATALOG

Seven Models of Compressors
Fifty-eight Models of High-sides from 1/2 H.P. to 15 H.P.
BRUNNER MANUFACTURING CO.
UTICA, N. Y.

This Simple patent is the secret that has made a SILENT V-BELT . . . and here's the reason



When a straight-sided V-belt bends around its pulley there is tension on the top of the belt and compression on the bottom. This makes the side walls bulge outward—as shown in figure 1, below.

The Gates Belt is built with a patented concave side. The bulge, due to bending, simply straightens the concave side to a precise fit with the sheave groove as shown in figure 2.

This exact fit naturally prevents slipping. No slipping means a SILENT belt, a belt that wears longer, a belt that does not heat and therefore does not stretch.

BELT GUIDE — FREE

The Gates Belt Guide is the recognized national authority on correct belt fit for ALL Refrigerators, Washing Machines, Pumps, Stokers, etc., etc. FREE from your Jobber or the GATES RUBBER CO., Denver, Colorado.

Write Today!

GATES BELTS



Figure 1



Figure 2.

330 Westinghouse Units Installed in Model Village

CINCINNATI—In Greenhills, the U. S. Department of Agriculture model village community constructed five miles from this city, 330 Westinghouse electric refrigerators are now being installed.

Homes in Greenhills are being built by the Resettlement Administration to provide good housing at modest rentals for families whose incomes range between \$1,000 and \$2,000 per year.

Housing units in the community are built to fit the needs of a variety of families. They consist of single family, two-family, three-to-six family houses, and some apartments. The community comprises 5,930 acres of land.

Westinghouse equipment being installed includes 275 4-cu. ft. refrigerators, 40 5-cu. ft. units, and 15 of 6-cu. ft. capacity.

Crosley Building New Radio Studios

CINCINNATI—Construction of a \$1,000,000 air-conditioned broadcasting center to house the activities of WLW, "The Nation's Station," and WSAI, "Cincinnati's Own Station," was started Sept. 1, according to Powel Crosley, Jr., president, Crosley Radio Corp.

The main part of the building will be three stories high, with a five story tower in front. The building will be completely air conditioned.

An auditorium, 60 by 80 feet, where 600 people can be accommodated at a single broadcast will be located on the first floor. The auditorium stage will be large enough to handle shows using 60 or 70 people.

Six other studios, in addition to locker and lounge space for men and women artists, a modern lunch room, a radio post office, will occupy the balance of the first floor space. Four studios will be located on the second floor.

The master control room, the news room with space for editor, writers, news morgue, automatic news printers, and four studios will occupy the second floor.

Third floor will house WLW music library which will measure 16 x 50 feet, and which will contain ceiling-high steel storage cabinets. It will also contain space for 28 offices for continuity writers, directorial, sales promotional, managerial, and musical directorial staffs.

Offices of Powel Crosley, Jr., president, Lewis Crosley, vice president, and William S. Hedges, vice president in charge of broadcasting, will be located in the fourth floor.

Fifth tower floor will be devoted to the technical department.

Callahan Resigns Briggs Plumbing Ware Post

DETROIT—J. A. Callahan has resigned as head of the diversified division of Briggs Mfg. Co., it was announced last week. For the past few years, Mr. Callahan has been general manager of the Briggs plumbing ware division, in charge of production and marketing drawn metal plumbing fixtures. An aeronautics engineer by training, he was with Curtiss Airplane Co. before coming to Briggs.

Nash Officers May Move to Detroit

KENOSHA, Wis.—Indications that at least part of the offices of Nash division, Nash-Kelvinator Corp. will be consolidated with similar offices of the corporation's Kelvinator division at Detroit are becoming increasingly prevalent here.

If the plan is effected, it is said that moving operations will commence about Nov. 1. The office personnel of the Nash plant here totals about 280 employees. Final decision on the consolidation is said to be expected soon.

Some indications of the proposed change follow:

Before vacations for office workers commenced early this summer, executives of sales, purchasing, advertising, and statistical departments are reported to have asked their staff members whether they would be willing to move to Detroit if the consolidation were effected.

When remodeling and expansion of factories was started late in July, some of the space formerly reserved for the larger factory offices was converted into additional space for production activities.

Harold E. Long, in charge of purchases for the company, and Horace G. Mellum, secretary and counsel, have placed their Kenosha homes on the market. The house in which Courtney Johnson, sales manager, is living is being offered for rent, subject to his moving. C. H. Bliss, vice president and sales director, has rented a home in Detroit, and is having his yacht overhauled for heavy service.

6-Month Sales by Philadelphia Dealers Well Over 1936 Total; Retail Price Averages \$174

Month	1937 Units Sold	1936 Units Sold	1935 Units Sold	1937% Increase Or Decrease Over 1936	1937 Retail Value	1936 Retail Value	1937% Increase Or Decrease Over 1936	1937 Average Price	1936 Average Price
January	3,135	2,532	718	+24%	\$ 524,071	\$ 456,989	+15%	\$167	\$181
February	6,119	3,657	2,634	+67%	1,076,607	681,667	+57%	175	186
March	9,051	7,668	6,357	+18%	1,570,635	1,349,089	+16%	173	176
April	9,452	9,870	6,652	-4%	1,638,226	1,718,797	-4%	173	174
May	9,743	9,911	7,885	-2%	1,695,279	1,719,936	-1%	174	173
June	9,103	6,641	5,936	+37%	1,608,916	1,108,942	+45%	177	167
Totals	46,603	40,279	30,182	+15%	\$8,113,734	\$7,035,420	+15%	\$174	\$174

Utility Sales

Month	1937 Units Sold	1936 Units Sold	1935 Units Sold	1937% Increase Or Decrease Over 1936	1937 Retail Value	1936 Retail Value	1937% Increase Or Decrease Over 1936	1937 Average Price	1936 Average Price
January	96	81	53	+19%	\$ 18,290	\$ 16,718	+9%	\$190	\$206
February	191	180	104	+19%	36,658	29,623	+23%	192	185
March	457	372	302	+23%	87,763	70,191	+25%	192	188
April	809	810	566	-.002%	157,812	152,348	+3%	195	188
May	892	867	719	+2%	177,393	163,008	+8%	198	188
June	850	768	715	+11%	172,633	143,474	+20%	203	186
Totals	3,495	3,058	2,459	+7%	\$ 650,549	\$ 575,362	+13%	\$197	\$188

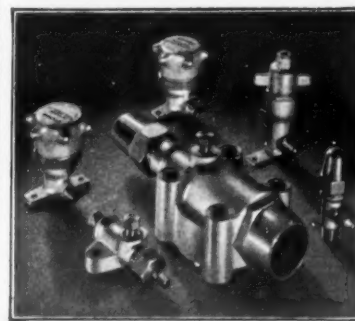
Note: Utility sales approximate 7.1% of total sales.

Report covers sales in Philadelphia, Bucks, Montgomery, Delaware, and Chester counties. Report includes sales of the following makes: Apex, Coldspot, Crosley, Frigidaire, Copeland, General Electric, Grunow, Hotpoint, Kelvinator, Leonard, Norge, Sparton, Stewart-Warner, Universal, and Westinghouse.

Hommel Takes 216 on Sales Campaign Award Trip

PITTSBURGH—Two hundred and sixteen dealers, salesmen, and members of the Norge refrigerator department of the Ludwig Hommel Co., distributor in Pittsburgh and the tri-state area, sailed Sept. 3 for a trip to Nova Scotia, climax to the company's annual spring and summer refrigeration sales campaign.

Upon their return, the party was to spend three days at the Ritz-Carlton hotel in Atlantic City.



PERFECTION Refrigeration Valves are Certified to Excel

Ask for catalog covering complete line of Valves, Fittings, Condensing Water Regulators, and Parts for Compressors.

PERFECTION REFRIGERATION PARTS CO. HARVEY, ILLINOIS

THE RIGHT BELT for EVERY V BELT DRIVE

FOR BEST PERFORMANCE ON LARGE AIR CONDITIONING UNITS SELL

GOODYEAR MULTIPLE V BELTS

made in matched sets; uniform length; accurate cross section

THE GREATEST NAME IN RUBBER

GOODYEAR

FRACTIONAL HORSEPOWER ENDLESS CORD V BELTS

To win and hold customers your V belts must fit. Goodyear Fractional Horsepower V Belts do fit because there is a special size correctly designed for every standard make and model of air conditioning unit, refrigerators and other popular appliances. Over 200 different sizes in all—each one exactly right in length and cross section!

Remember, tests prove the Goodyear-perfected, high tensile, endless cord construction gives far longer life with practically no stretch—insuring customer satisfaction and repeat sales.

Remember, too, every one bears "the greatest name in rubber"—the guarantee of highest quality in belting. And with every standard Goodyear assortment you are furnished with a handsome three-color metal display rack—a real sales maker.

Call your jobber today for prices and our Handy Application Guide—or write Goodyear, Akron, Ohio, or Los Angeles, California.

BIGGER PROFITS ON WASHING MACHINE WRINGER ROLLS FOR YOU!

Goodyear Universal Washing Machine Wringer Rolls eliminate carrying a large stock of made-up rolls, increase turnover and profit. Made in six standard diameters with extra rubber and shaft length that can be quickly cut to fit any wringer with Goodyear Combination Milling Machine. Write for data.

Anaconda Copper Refrigeration Tubes

BRIGHT INSIDE!

THE AMERICAN BRASS CO.
FRENCH SMALL TUBE BRANCH
General Offices: Waterbury, Conn.

AIR CONDITIONING

Plumbers Must Install Orlando, Fla. Cooling Systems, Board Rules

ORLANDO, Fla.—The plumbing board of Orlando has ruled that a master plumber must install air conditioning, and that air-conditioning distributors and dealers in the city must obtain permits on installations in which water used in the system passes into a waste connection.

According to the ruling, air-conditioning equipment is classified as a plumbing fixture, and water coming from the compressor and unit box must be discharged over an open plumbing fixture. This installation requires a permit which must be inspected by the plumbing inspector.

The rule was made as protection against the possible contamination of water coming from air-conditioning units using water, the board announced.

Room Coolers Condition Optometrist's Offices

GREELEY, Colo.—Dr. Edwin J. Haefely, optometrist, has had his offices here completely air-conditioned with Frigidaire room coolers. The sale was made by the Weld County Garage.

Natural Gas Powered Units Run Detroit Theater System

DETROIT—Powered by two conventional automobile engines adapted to burn natural gas as fuel, a 120-ton refrigerating capacity air-conditioning system has been installed by Simplex Engineering Corp. in the Beverly theater, one of Detroit's newest motion picture houses.

The two 60-ton Baker ammonia refrigerating machines and other commercial refrigerating equipment used in the system were supplied by the local branch of the Burge Ice Machine Co., of which J. T. Coan is manager.

Details of the installation and adaptation of the two engines were worked out by engineers of the Detroit City Gas Co. in cooperation with the Simplex company.

According to L. M. Mitchell, manager of the theater, the installation is the first of its kind to be used in a Detroit auditorium, although similar units are in use in several local packing house refrigerating plants.

The gas-burning automobile motors are connected to the compressors to provide the power required to cool, clean, and circulate the air in the 1,500-seat theater.

Mr. Mitchell says that the engines operate quietly and economically.

Boston Bureau to Have Outing Sept. 24

SWAMPSCOTT, Mass.—The fourth annual outing of the Air Conditioning Bureau of Boston will be held Sept. 24 at the New Ocean House here.

Approximately 500 persons are expected to attend, including members of the bureau itself and of such allied organizations as National Association of Practical Refrigeration Engineers, Air Conditioning Manufacturers Association; Boston Oil Burner Associates, New England Building Officials Conference, American Society of Heating and Ventilating Engineers, and American Society of Refrigerating Engineers. Many prominent local architects and builders also are invited.

Don J. Edwards is chairman of the committee in charge. Julius Daniels is chairman of the general committee, which includes Walter Fleischer and D. S. Boyden, engineers; Professor James Holt, Massachusetts Institute of Technology; and James P. Moyer, director of university extension, state department of education.

Pushing Self-Contained Units Widens Market, Airtemp Dealer Finds

DALLAS—Since it began featuring 3-ton self-contained units for commercial customers, many markets previously difficult to reach have been opened to the Viking Air Conditioning Co., Airtemp dealer, observes J. E. Bush, owner and operator.

Because of the shortness of time required to install the units, and because they require no ductwork, this equipment contains special appeal for proprietors of small shops, stores, beauty parlors and restaurants, Mr. Bush reports.

"We sell multiple units to concerns where larger areas are to be cooled on the strength of the economy of operating such equipment, for when the heat load is small, only part of the units need be used," he declares.

Inability to find enough trained, experienced engineers to work on their jobs, is the one factor restricting the Viking Air Conditioning Co.'s sales volume—otherwise "business is excellent," Mr. Bush declares.



TRAINING MEN IS OUR JOB
And U.E.I. Free Placement Bureau supplies trained shop mechanics, installation and service men to this industry. When you need a good workman, use this Free Service. No fees of any kind.
UTILITIES ENGINEERING INSTITUTE
404 N. Wells St. Established 17 West 60th St.
Chicago, Illinois 1927 New York, N.Y.

'Portable' Central System Solves Problem Of Cooling Rented Space, Natkin Believes

TULSA, Okla.—The recent air-conditioning installation made here in the general offices of the Central Petroleum Co. by Natkin & Co., local air-conditioning distributor for Westinghouse, is of unusual interest because it is a "portable" central system air conditioner, installed to meet the demand of the purchaser for a unit which could easily be moved in case his offices are transferred to some other location in the future.

Another requirement of the purchaser (Nathan Appleman, president of Central Petroleum) was refrigerating capacity sufficient to maintain an inside temperature of 78° F. coincident with an outside temperature of 100° F. Therefore, the installation was designed to meet these demands.

COOLING EQUIPMENT

The air-conditioning unit installed is a self-contained model, consisting of a 3½-hp. Westinghouse sealless, hermetically sealed compressor, a Fedders direct-expansion coil, a blower-type fan with ¾-hp. motor, together with the necessary controls and other accessories. The entire assembly is housed within a vertical "crinkle" enamel finished cabinet whose overall dimensions are approximately 30 inches wide, 24 inches deep, and 84 inches high.

All mechanical parts are supported on sound and vibration-dampening springs or cushions, so that the unit is said to be very quiet in operation.

The recirculating air inlets are arranged one on either side of the conditioner, while the conditioned air discharge is from the top. Since both compressor and compressor motor are water cooled, ventilation for the compressor compartment is unnecessary.

This interesting model is designed, engineered, and sold by Natkin & Co., and is fabricated for them in St. Louis. It is known as model SV-135.

Tallest Texas Building Gets Cooling System

HOUSTON, Tex.—The Second National Bank building, Texas' tallest office building, is being equipped with a 480-ton air-conditioning system installed by the Dixie Heating and Ventilating Co.

Installation of the system, claimed to be one of the largest in the southwest, is being made in the 22-story building as part of a remodeling program.

Augusta Dept. Store Reports 40% Sales Increase

AUGUSTA, Ga.—Since an air-conditioning system was installed in the Donald Fortson Co., department store here, its business has shown a 40% increase over 1936.

The air-conditioning unit was installed in a corner of the reception room adjacent to the stenographer, who disclaims any annoyance from her proximity to the air-conditioning machinery.

Conditioned air is distributed from the central unit to the various offices through a very simple system of ducts and Uniflo type directional grilles. Air is recirculated from the offices through grilled doors into the reception room, and thence to the recirculating openings in the cabinet of the air conditioner.

An outside air intake with manually controlled damper and with intake louvers set in an adjacent window is provided for the purpose of drawing in outside air to dilute tobacco smoke and to provide ventilation as desired.

FLEXIBILITY SHOWN

"This particular installation has proven very satisfactory both from an installation standpoint and quietness of operation," declares Bert Natkin, local manager for Natkin & Co.

"Its flexibility is apparent in that in moving this equipment, if need be, all that will be lost is the actual ductwork and labor in installing same. The unit, return and supply grilles, and fresh air intakes may all be salvaged.

"In fact at time of writing the Central Petroleum Co. is very seriously considering moving their offices to Wichita, as it is closer to the center of their operations, and we are checking into the moving of this equipment for them.

"Such an installation seems to be an answer to the problem of air conditioning several offices when located in a public office building, because all equipment is concentrated in one location, fresh air is accessible, the installation is quiet and the results are satisfactory."

Patent Novelty Co. Puts Humidifier on Market

CHICAGO — A new humidifier which traps the dust rising with the heat as well as supplying moisture to the air has been placed on the market by the Patent Novelty Co., Fulton, Ill. The unit can be attached to any register.

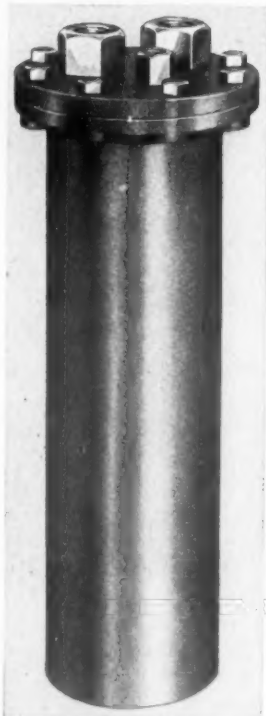
Norge Equips Model Home At Newport News, Va.

NEWPORT NEWS, Va.—Norge equipment, including an air-conditioning system, a Rollator refrigerator, a range, and a water heater, has been installed by Refrigeration Service in a new model home at 6 Westover road.

An—

OUTSTANDING PRODUCT

BUILT AND ENGINEERED TO MEET A DIFFICULT REQUIREMENT



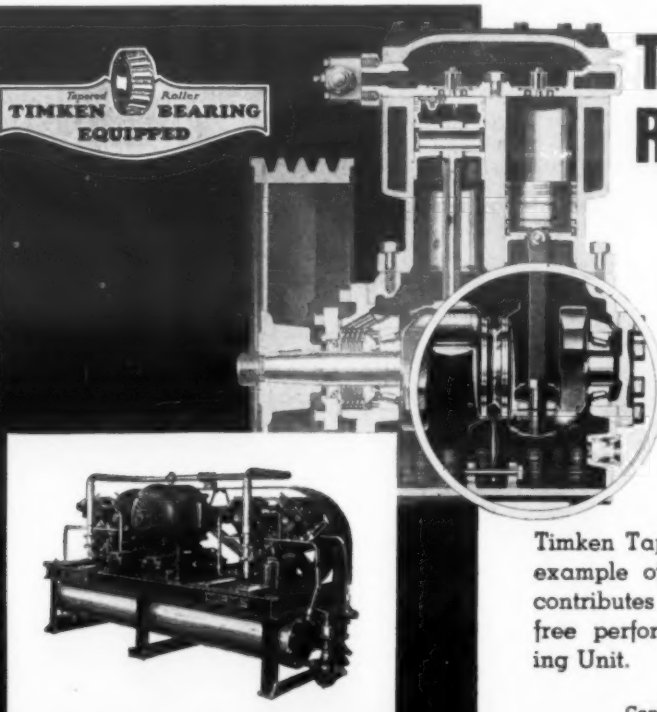
TYPE "H"

OIL SEPARATORS WITH AUTOMATIC OIL RETURN

This ingenious Blue Ribbon oil separator with automatic oil return is located between the compressor and condenser. It consists of a steel shell sufficiently large to retard gas velocity and partially remove the sensible heat of compression. However, merely retarding gas velocity is not sufficient. In this oil separator the oil-laden discharge gas from the compressor passes through an efficient oil scrubbing device which absolutely assures every atom of gas and oil impinging itself on an oily metal surface before it can leave the oil separator. The oil collects in the bottom of the shell and the oil-free gas passes directly to the condenser.

Write for Bulletin No. 14 giving complete information on this product.

AMERICAN INJECTOR COMPANY
RILEY ENGINEERING CORP. Associate
1481-14TH ST. • Phone LAFAYETTE 0350-0552 • DETROIT, MICH.



TIMKEN TAPERED ROLLER BEARINGS

TIMKEN, TAPERED, ROLLER BEARINGS have been proven by years of use in leading American automobiles. In your CURTIS COMPRESSOR, special, sound-proof type Timken Bearings add to the efficiency, smooth operation and long life. Unlike other types of anti-friction bearings, they provide for easy outside adjustment for wear if necessary.

Timken Tapered Roller Bearings are another example of the advanced engineering that contributes so much to efficiency and care-free performance of the CURTIS Condensing Unit.

Represented in Canada by
Canadian Curtis Refrigeration Co., Ltd.
20 George St., Hamilton, Ontario

CURTIS

CURTIS REFRIGERATING MACHINE COMPANY
Division of Curtis Manufacturing Co.
1912 Kienan Avenue, St. Louis, Mo.

COMMERCIAL NEWS

Kelvinator Names 9 New Distributors

DETROIT—Nine new commercial distributors have been appointed by Kelvinator division of Nash-Kelvinator Corp., announces J. A. Harlan, manager of Kelvinator's commercial division.

The following distributors have been awarded varying franchises in line with Kelvinator's present expansion of commercial activities:

Everett Smith Automatic Temperatures, Inc., Milwaukee, Alhart Electrical Co., Inc., Rochester, N. Y.; Standard Engineering Co., Utica, N. Y.; Standard Co., Inc., Fall River, Mass.; Rezendes Electric & Radio Co., New Bedford, Mass.; Robinson Electric Service, Cairo, Ill.; Gowan & Everett, Inc., Abilene, Tex.; McLoon Sales & Service, Rockland, Me.; and Keeler Motors, Inc., Wilkesburg, Pa.

Midwest's New 'D' Series of Commercial Cabinets Ranges from 25 to 66-Cu. Ft. Capacities

GALESBURG, Ill. — Midwest Stamping & Enameling Co. has just introduced a new "D" series of commercial refrigerator cabinets available in capacities of 25 ft., 27 ft., 44 ft., and 66 ft.

Cabinets are finished in Bonderized Dulux, inside and out, with the exception of the inside bottom which is porcelain.

The refrigerating coil (which can be furnished by Midwest) is installed and serviced through the service door openings. A baffle under the coil is designed so that it can be removed easily. Adjustable shelf supports are furnished.

Typical of the models in the new line, model D44 is similar in size to Midwest's AP44 model, used in grocery stores, meat markets, hotels, etc. Dimensions are: width, 57 inches; depth, 33 inches, and height 87 inches. It has a food storage capacity of 43.3 cu. ft.

Seeger Introduces New 6-Ft. Display Case

ST. PAUL—Series 17, a self-contained, all-purpose, 6-ft. display case, is being presented to trade and public by Seeger Refrigerator Co.

Features of this new line of commercial display cases include; Seeger double fin-type coils; triple-thickness glass front with Seeger patented ventilation; compressor located in ventilated section of base; molded hard rubber doors; continuous porcelain lighting reflector built flush with top of case.

The case measures 6 ft. in length and 53 1/4 in. in height. It is finished in white Dulux with black trim, and lined with acid-resisting white porcelain. The case is designed with straight sides so that it will fit tight to counters and other store fixtures, or to other Seeger cases.

Gleokler & Midwest to Use Filterpure Units In Commercial Boxes

HAMMOND, Ind. — Two more manufacturers of commercial refrigerators—the Gleokler Mfg. Co. and Midwest Stamping & Enameling Co.—have adopted Filterpure units for use in their cabinets, according to announcements made recently by Lyman Betz, head of the Betz Corp., manufacturer of the Filterpure unit.

The Filterpure unit combines the functions of temperature and humidity control with air purification and air circulation.

The unit is of enclosed construction, and includes a copper cooling coil, a small blower, and a bed of activated carbon which is said to deodorize and purify the air.

Air is brought into the Filterpure unit by means of flues or small ducts, and is discharged on both sides of the unit at the bottom.

Cleveland Dairy Puts Large Refrigerated Truck on Road

CLEVELAND—A large transport ice cream truck has been added to the fleet of Telling Belle Vernon, Inc. here, a subsidiary of National Dairy Products Corp. of New York City. Warnsman, Inc. of Cleveland built the body.

Eight-inch insulation was used throughout the body for maintenance of zero temperature. The Kelvinator air-cooled truck-type refrigeration compressor is powered by a Century Whitaker-Upp automatic electrical power system. Fin coils are used.

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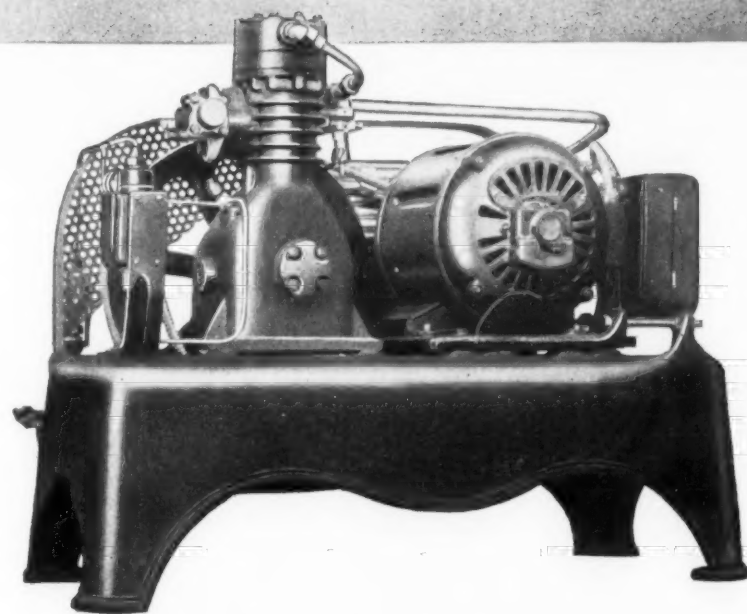
That's why Activated Alumina should be considered for air conditioning. It adsorbs moisture, reducing the humidity. This eliminates the "clamminess" and "shock" often experienced when the humidity of cooled air is neglected.

Comfort conditioning equipment of moderate size, and industrial systems designed to reduce relative humidity, are both suited to economical operation with Activated Alumina. Our engineers will be glad to discuss this principle with you. Send for the recent booklet, *Activated Alumina, Its Properties And Uses*, containing data useful in the development of air conditioning equipment. ALUMINUM ORE COMPANY. Sales Agent: ALUMINUM COMPANY OF AMERICA, Pittsburgh, Pennsylvania.



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SECOND—Universal Cooler's sales policy permits manufacturers to sell our product to their customers at a profit.

THIRD—Universal Cooler's many years in the business and close relationships with leading equipment and fixture manufacturers has given us a far broader experience throughout the entire field of mechanical cooling than usually comes to any one manufacturer.

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The above picture illustrates a typical air-conditioning application using Wagner motors. A Wagner 7 1/2-hp type RP polyphase squirrel-cage motor is belt-connected to the air-conditioner in the basement of a large department store in Texas.

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GEAR-MOTORS
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HAZARDOUS-GAS
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TOTALLY-ENCLOSED-FAN-COOLED
VERTICAL MOTORS
RIGID MOUNTED
ANNULAR RUBBER MOUNTED

Adequate Organization & Profit Margin Needed to Keep Dealer In Air Conditioning—Buschman

ST. LOUIS—A distributor—or a dealer with enough financial backing to do some necessary pioneering—can make a mighty nice profit out of the air-conditioning business today, believes H. W. Buschman, secretary and general manager of Controlled Air Corp., Airtemp distributor in Missouri and the Illinois territory south of Springfield—but it's too big a bite for the small dealer, except on a part-time basis, he thinks.

"The small dealership, especially in the small and medium-size city, can't afford to get into air conditioning at present, except on a part-time arrangement—that is, handling air conditioning in addition to major appliances or some other line of equipment that will insure a fairly steady income the year around," he says.

"There's too much pioneering work in these small towns for the dealer—the normal small-town dealer, that is—and sales are too few and far between."

A new company, Controlled Air Corp. was organized at the beginning of this year after Weber Automobile

Co., former Airtemp distributor, had decided to give up that end of its business. Mr. Buschman, who managed the air-conditioning department for Weber, came with the new company as secretary and general manager.

With an anticipated volume of \$400,000 during its first year in business, Controlled Air had passed the \$250,000 mark during the first six months.

In the St. Louis metropolitan area, the company does a combined dealer-distributor job on Airtemp and oil-burning equipment, and acts as distributor in the outlying Missouri and Illinois territory it covers.

STAFF AND SALARIES

On its headquarters engineering staff, the company has a chief engineer and four assistants, whose salaries range from \$300 to \$500 per month. Two draftsmen work in the department, at salaries of \$100 to \$135 a month, and two sales engineers cover the metropolitan area at a salary of \$200 a month and a 1% override on sales.

Another sales engineer, who is paid on the same basis as the two metropolitan workers, handles field engineering work in the territory outside the St. Louis area.

To contact its dealers in Missouri and Illinois, Controlled Air Corp. employs two dealer organization men, one covering one state and one the other, and pays them \$200 a month plus 2% on sales.

In St. Louis, the company has two sales supervisors, one handling retail and the other wholesale business. Both receive salaries of \$200 a month plus a 2% override. The wholesale man has three "display" dealers on Airtemp, and 10 who sell

heating equipment. The retail supervisor is in direct charge of the company's retail sales force.

In its service department, Controlled Air has a service manager at a salary of \$200 a month; a stock-clerk, whose duty it is to clear all service work, and assign service men to jobs; a steam-fitting foreman, and a refrigeration service foreman.

OBSTACLES TO VOLUME

Two major obstacles, in Mr. Buschman's opinion, now stand in the way of volume business in air conditioning. These are:

1. The buying public, for the most part, hasn't the faintest conception of what a properly engineered air-conditioning system should cost.

2. Too much of the price of an air-conditioning system today is eaten up by the cost of installation.

Answer to the first problem is one of public education. And this, says Mr. Buschman, is a slow matter, and not nearly so simple as it appears on the surface.

"People still gasp when they are told how much an air-conditioning system will cost them," he says. "They haven't the slightest idea of the dollars-and-cents value of the equipment."

INSTALLATION COST CUT

Air conditioning's second major problem—the cost of installation—was solved in a great measure for his company this year by Airtemp's introduction of the 3-ton self-contained unit, declared the manager. Mr. Buschman thinks this may be the eventual answer to the installation bugaboo—and he wouldn't be surprised to see other companies put similar units on the market next year.

"With the 3-ton self-contained unit, we can handle installation for \$100 added to the price of the equipment. In fact, this spring we did advertise installation for \$100, if the unit were placed within 30 feet of water and electrical connections," he declared.

"It made a tremendous difference in our sales price—a job that used to cost \$1,500 we could offer for \$800. And don't think it didn't make the job easier for the customer to understand. An installation cost of \$100 was something he could grasp—and he really grasped it."

Indication of the self-contained unit's popularity with prospects is the fact that of Controlled Air Corp.'s sales through the first seven months of the year, fully two-thirds were of this type.

Manufacturers want—and need—representation in the smaller towns, and the larger-size self-contained unit may be the answer, Mr. Buschman believes. Whatever else it may accomplish, one thing is certain—it will make the cost of air conditioning easier for the customer to understand.

Beginning: a Series of Interviews with Dealers about The 'Profit Problem' in Air Conditioning

Air conditioning has come of age, and it is time that those engaged in selling it should be getting a more tangible reward than the honor of "pioneering" a new development of the scientific age to the public.

Yet, executives of leading manufacturing firms in the air-conditioning field have told us that one of the major problems facing the industry today is the failure of the dealer-contractor to make a profit from selling air-conditioning equipment.

"Lack of knowledge about the special problems involved in selling air conditioning is the reason why the managements of dealerships have failed to show a profit at the end of the year," the manufacturing executives told us. "Why don't you publish some articles telling the dealer how to manage his business so as to make a profit?"

AIR CONDITIONING AND REFRIGERATION NEWS doesn't believe that its function is to tell any part of the industry how it should operate. The publishing policy of the News rests on digging out and publishing facts about the industry and its progress that will be informative and helpful.

At the same time the News wishes to be of the greatest possible service to its readers, and to help them meet their problems. But it thinks the best way to do this is to publish facts, not speculation; to report accomplishments, rather than to suggest some untried idea.

All this is by way of saying that on this and the following page is the first in a series of interviews with leading air-conditioning dealers in widely scattered sections of the country, in which are discussed the problems of (and sometimes the answers to) successful management of an air-conditioning dealership.

We make no claim that these interviews contain the whole answer to the problem, but they do present the facts about methods of management that have meant success to a particular dealer.

SALESMEN ON COMMISSION

Retail salesmen work on a straight commission basis; there is no drawing account. On self-contained units sold at list price, the men receive commissions ranging from 10% to 7½%, depending on individual conditions.

When jobs get into the "tailor-made" class, the commission goes down as the price of the complete job advances, and may end up anywhere between 7½% and 2½%. These percentages are approximations, as the company has a set commission price (in dollars) for every system from 3 tons up.

Engineering and sales departments of the Controlled Air organization

are kept separated, and there are no steps of supervision between them.

The question of markup, a major problem with air-conditioning dealers, is handled by Controlled Air Corp. on a sliding-scale basis. The scale runs between 18% and 40%, depending upon the size of the job. On a \$20,000 job, for example, the markup may come down as low as 18%; on a 3 or 5-ton job, it may go as high as 40%.

In the markup, the company figures to cover overhead expenses and its profit. Engineering expense, says Mr. Buschman, is a necessary part of the air-conditioning business that the company hasn't as yet

(Concluded on Page 9, Column 1)

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"UNBELIEVABLE!" That's what manufacturers say when they examine the engineering features of the new "Loxit" door units, (doors—rails—jamb), they realize suddenly that LOXIT COSTS NO MORE THAN ORDINARY DOORS.

Consider, for example, these Loxit improvements: 1. Locked-in, lift-out doors. 2. Tightly-closed overlap. 3. Reduced air leakage. 4. Lighter weight. 5. Greater structural strength. 6. Roller bearings. 7. Shock-absorbing jamb. 8. Quiet closure. No wonder "Loxit" doors have such enthusiastic preference.

Wide Range of Sizes

Ace "Loxit" Hard Rubber Door Units (doors, rails, jamb) are made in many sizes to fit regular display cabinet types. Storage and service doors, glazing strips, trim, etc. Manufacturers: write for details and prices.

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When you install air conditioning equipment use M & E Compressors... get the plus values these units offer in dependability and operating economy. Such features as forced lubrication, automatic belt-tightener, counter-balanced Molybdenum Steel crankshaft, self-cleaning continuous fin type counter-flow condenser, sound absorbing, rugged, cast base, etc., insure long, trouble-free life, low maintenance and smooth, quiet operation. Ask for complete information.

M & E COMPRESSOR UNIT A-24000 WF

4-cylinder, 15 h.p., water-cooled unit for heavy duty refrigeration and air conditioning service.



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MERCHANT & EVANS CO. PHILA., PA. U.S.A.
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Two Head Men at St. Louis Air-Conditioning Firm



H. W. Buschman, general manager, and V. E. Hugoniot, chief engineer, of Controlled Air Corp., St. Louis air-conditioning distributorship whose operations are described in the accompanying article, examine a new individual-room air conditioner.

3% for Service Added To Air Control Price By St. Louis Firm

(Concluded from Page 8, Column 5) found a way to come out on.

Dealers in his territory are absorbing this expense, and Mr. Buschman has no alternative but to do likewise. But competitive conditions are clearing, and as the market for air-conditioning equipment broadens out, he sees a not-too-far-distant day when all engineering will be handled by a central engineering bureau.

Estimates on all jobs would be referred to this bureau by the dealer or dealers interested, the bureau would check on the installation and make specifications, leaving cost of equipment the major factor to be determined by competing dealers. Cost of maintaining the bureau would be shared by all dealers using its services.

At present, though, the dealer's only way of keeping down engineering expenses is to see that the department figures only on jobs that it has a more-than-even chance of landing.

"It doesn't cost much to have an engineer survey the proposed installation and give the prospect an estimate high enough to cover all probable costs," Mr. Buschman says. "If he's still interested after getting that figure, he's worth going to work on in earnest."

SERVICE SETUP

Controlled Air Corp. does make an extra charge of 3% of the cost of the equipment as a service reserve to cover expenses involved in giving the year's free service on all jobs which competition demands. Factory recommendation on this is 2%, Mr. Buschman says, but his company has added another 1% for safety's sake.

This "one year" service actually means one season, in the case of most equipment, Mr. Buschman says—and he believes that dealers might also save themselves a lot of time and trouble if they put servicing of both new and used equipment on a flat-rate basis.

His company plans to send a service man to all of its jobs this fall, after the refrigeration season is past, to pump down the system and prepare it for its winter lay-off. In the spring, the company will make the small adjustments necessary to get the job back into operation.

For a cost of about \$7.50, he believes, dealers might offer such a service to all their customers, or to anybody owning an air-conditioning system. It would be a profitable venture from both ends—the dealer

could make money on his service man's time, and the owner of the system would save himself repair and refrigerant bills the following spring as a result of the job's being properly shut and pumped down.

DIGGING UP SALESMEN

Controlled Air Corp. employs 15 retail salesmen in its air-conditioning department. Some of the men make good from the beginning, some fumble around for a while and finally get going—and others just fumble around. These last named ones usually aren't in the business very long.

What background has he found most successful in selling air conditioning? It's a matter of the man rather than the job, Mr. Buschman believes.

Some of his best men formerly sold electric refrigeration, another one used to sell life insurance. In general, the men most likely to stick it out until they make a go of it are those with some engineering training, he has found. But perhaps that just happened, and Mr. Buschman doesn't want to set it down as a general rule.

"We don't try to make engineers of our salesmen," he declares. "If they happen to be engineers when they come to us, we may have to teach them to sell."

"In our organization, the salesman's job is to sell. When there's engineering work to be done, we turn that over to competently trained engineers. We keep selling and engineering separated, because we believe it doesn't pay to mix the two departments."

Training of salesmen is handled by the company. Schools are held regularly, material for sales training being furnished both by the distributor and the factory. All retail salesmen are trained—those for outlying dealerships as well as the company's own employees.

FINDING PROSPECTS

Obtaining prospects? It hasn't been a job, Mr. Buschman says. "Prospects come in looking for us," he declares. "Especially since Airtemp brought out its 3-ton self-contained unit."

"This gives the salesmen a better break—they don't have to go in 'cold.' We did a limited amount of canvassing of neighborhood business centers while I was with Weber, but since we formed the new company inquiries have kept us on the jump."

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without the need of looking for any outside prospects."

Best sales argument his men have found for commercial air-conditioning prospects, Mr. Buschman says, is the "investment and profit" angle.

"We try to make the business man-prospect see air conditioning as a protection against competition. We show him how many of his competitors are installing cooling equipment, and point out to him the necessity of keeping in step with his field."

"The same argument can be used in dealing with owners or managers of large office buildings. They want to keep their tenants from moving out. So it's an investment against competition."

"We can show restaurant owners, for example, how competitors with air-conditioning equipment have sold more meals, at higher prices, than ever before. We can show building owners how tenants have gladly paid higher rentals to get the comfort of air-cooled offices. That takes care of the 'profit' side."

SELLER'S MARKET NOW

One of the most encouraging things in recent air-conditioning developments, to Mr. Buschman, has been the gradual change of the business from a buyer's to a seller's market.

"In the early days, the prospect had the whip hand—and how he used to make us sweat!" he recalled. "To sell him an air-conditioning system, you almost had to remodel his place, free of charge."

"But now, demand for conditioning equipment has broadened the market into a seller's market. Price resistance is gradually diminishing—the prospect knows air conditioning will pay out—and so you can deal

at your own terms. If the prospect hesitates, you can let him consider the matter 'til next year—there are other jobs for you to go on to."

Controlled Air gets cash for about 75% of its sales, Mr. Buschman says. This includes the cash received from Commercial Credit Co. for jobs which the company finances through it.

Terms on self-contained units are 10% down, with the balance payable over 36 months. On the general run of air-conditioning jobs above that class, the company's practice is to ask 25% with order, another 25% when the equipment is delivered, the third 25% upon installation, and the last 25% between 10 and 30 days after the completion of the system.

The largest installations are usually made on American Institute of Architects (A.I.A.) terms. These terms are standard: 85% in payments on the first and fifteenth of the month the system is being installed, and the remaining 15% when the job is accepted by the buyer. All jobs sold on A.I.A. terms are supervised by a consulting engineer.

Advertising and sales promotion expense is figured in the budget at 2%. Fully 75% of Controlled Air Corp.'s advertising is done by direct-mail. Large newspaper space is not needed, Mr. Buschman believes, since there is as yet no general market for air conditioning; and St. Louis has no "class" magazine. All direct-mail is planned by J. Stirling Getchell, Inc., Airtemp's advertising agency.

General operating expenses of the company are figured at about 12%.

On installations, the company does all refrigeration work itself. Electrical and sheet-metal work are sublet, and the company takes a markup of 20% on time and labor. On outside purchases which are made, the company charges its cost plus a markup of 10%.

Asked where his refrigeration service men were trained, Mr. Buschman said most of them came by way of commercial refrigeration experience.

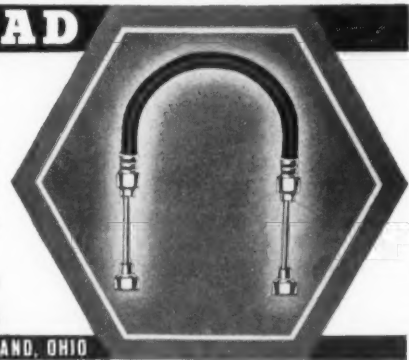
"None of them are beginners," he said. "They've all been around the refrigeration industry for a good many years."

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Solving the Price Problem

ESTIMATES based on sales from manufacturers to distributors indicate that 1937 unit air-conditioning business will be up at least 35% over sales of such equipment in 1936.

That is a good increase; but sales managers predict it will be small compared with the jump of sales in unit air conditioners in 1938. The reason for this optimism is the price factor.

To date, the one objection of any consequence which a salesman of air-conditioning equipment encounters is that of price. Everybody wants air conditioning, but relatively few persons seem prepared to pay for it. Most prospects are positively appalled when they hear what it will cost to air condition their place of business or their home.

Commercial and Industrial Installations Self-Liquidating

To the owner of a factory in which temperature or humidity control is important in maintaining the quality of his product, the objection of price can be overcome. With case studies from other plants in the same field which have installed air conditioning, the salesman can demonstrate that such equipment will pay for itself and eventually return the purchaser a profit.

The same condition holds true in the commercial division of air-conditioning sales. Theaters, department stores, restaurants, night clubs, beauty parlors, hotels, hospitals, specialty sales show-rooms—all such places which cater to a discriminating public can justify the purchase of expensive air-conditioning equipment on the basis of increases in sales and customer satisfaction.

After the first few sales in this field, the salesman can even throw away his "case book." A restaurant keeper, who may have turned down the air-conditioning salesman on his first calls, watches his

competitors down the street—who did install air conditioning—take business away from him.

That hurts. He changes his mind, and air conditions his place, too. The two air-cooled spots then cut heavily into the business of other restaurants, and soon practically every cafe owner in that section must install air conditioning to protect his trade.

Little Progress in Home Air-Conditioning Sales

But air conditioning for human comfort—where profits and sales are not directly involved—is a horse of a different color. The man who will cheerfully pay a bill running into four or five figures for a tailor-made central system air-conditioning plant in order to increase his business or prevent his clientele from disappearing is not nearly so cheerful when confronted with an estimate for air conditioning his own home.

In like manner, it is often difficult to sell an office manager on air conditioning for this comfort and health protection of his employees, stories about increased efficiency and less time off for illness to the contrary notwithstanding.

Custom-Built Central Systems Justifiably Costly

There is no doubt about the fact that a custom-built central air-conditioning system costs money, and plenty of it. It should, and anyone who examines such a plant and its installation knows that the prices charged are justified.

Manufacturers and dealers are just as anxious to get their prices down to the lowest possible point as is the public, for they know that high costs are their biggest obstacle.

But air-conditioning systems are highly complicated, must be individually engineered, and require a great many parts and supplies from a number of different sources.

Air-Conditioning Systems Difficult to Package

"Package goods" air conditioning has long been considered the only practical answer to this dilemma. Yet no mechanical specialty has ever offered more difficulties to would-be designers of such units than has air conditioning.

Nevertheless, unit coolers and unit air conditioners have progressively improved in design and effectiveness, and this year have been produced in sizeable quantities for the first time by several manufacturers. As production goes up, prices come down. And everybody benefits.

It is no doubt true that the central system, designed on the spot to fit the building, is still the best way of air conditioning almost any given home or office, just as the central system is the most satisfactory way of air conditioning a factory or restaurant.

Unit Air Conditioners Help Answer Price Objections

But individual rooms in a home or office building can be conditioned for human comfort with mass production units to the immense pleasure of the occupants of such rooms. And at much less cost.

Air conditioning one or two rooms of a home by means of units has become fairly popular

this season; and with intensive promotional and sales effort next year, should become even more popular.

Sale of Unit Conditioners 'Spotty' in 1937—and Why

In 1937 the sale of unit conditioners has been quite spotty. Sales in some cities—like Chicago, for example—have been highly disappointing to manufacturers. Two reasons can be assigned: (1) excessive installation costs, and (2) restrictions in the form of municipal ordinances and labor union regulations.

Trade associations are said to be the cause of the first, and the cure for the second. Diplomacy and wire-pulling can often remedy hamstringing local restrictions. But excessive installation costs can be cut down only when distributors and dealers—and public utilities—realize that padding installation charges will prevent the growth of their business and the attainment of profitable volume.

"The more you sell, the more you can sell" is a slogan which seems especially applicable to unit air conditioners. Once the ball starts rolling, it should attain tremendous momentum.

LETTERS

Recognized Jobbers

Thermal Co., Inc.
Jobbers
Supplies, Controls, Parts
for
Automatic Heating, Refrigeration,
Humidifying, and Air Conditioning
2434 University Ave. (Midway)
Saint Paul, Minnesota

Sirs:

We note in your issue of Aug. 11, on page 22, that you list various firms where copies of AIR CONDITIONING AND REFRIGERATION NEWS may be secured. We note also, that this list is headed "supply jobbers" and that it includes several firms who are not recognized as supply jobbers, but rather as service organizations.

Would suggest that you check this list of supply jobbers with an approved list obtainable from Samuel R. Bush, executive secretary, 111 West Washington St., Chicago.

H. W. SMALL,
President.

Answer: In appointing authorized distributors for the News and the books published by this company we may have included some who do not qualify as jobbers according to the standards of the Association. Even the Association, we understand, has had some difficulty in determining the matter of eligibility.

It would simplify matters for us, as well as manufacturers, if we could simply refer to the Association any question regarding the status of a concern claiming to be a jobber. However, at present, it appears that qualifications for membership in the Jobbers Association and qualifications for distributors of our publications are not exactly parallel.

We are naturally interested in those concerns which will display our manuals to considerable floor traffic or promote their sale by means of illustrated catalogs. It is important that we make the books available to prospective buyers and it is logical to sell the books wherever servicemen, students, and other buyers congregate.

New Edition of Directory Will Have 3 Sections

Pelco Electric
Refrigerator Division
Portable Elevator Mfg. Co.
Bloomington, Ill.

Aug. 25, 1937

Editor:

Will you please advise me when the new 1937 Business Directory of the Refrigeration Industry will be issued.

My order for this has been in for several months, and I understood it was to be ready for issue several weeks ago.

E. W. JONES, Sales Manager,
Refrigerator Division.

Answer: We are pleased to say that work on the new edition of the Refrigeration and Air Conditioning Directory is now making real progress. However, it will be called the

Busy Days at G-E's Home Service Headquarters



Members of General Electric's home service section at work in their new headquarters office at Nela Park. Left to right are: Grace Poslar, secretary; Winona Curney, laboratory assistant; Nancy Pullin, home economist; Adelaide Fellows, assistant home service director; Edythe More, traveling home economist; Edwina Nolan, manager of the home service section; and Clara Cole, traveling home economist. Ann Kollin and Linnea Lorenson, other members of the department, were not present when the picture was taken.

1938 edition and will appear in three separately bound sections, similar in size to the popular Master Service Manuals.

The first section will contain the classified products listings, advertisements of manufacturers, and alphabetic index with complete addresses, telephone numbers, etc. This is the section most used by buyers. We hope to have it off the press early in November.

The second section will contain the information most used by sellers, such as geographical listings of manufacturers with personnel, etc. It will be ready about Jan. 1.

The third section will contain the historical data on current and obsolete trade names, companies no longer in business as well as active manufacturers, and other miscellaneous information much in demand by the planners and researchers of the business but which is not required in the ordinary buying and selling activities.

With this logical division of the material we can provide the trade with books of convenient size and at a popular price (\$1.00 per copy), giving just the information desired. An attractive and durable binder will be made available for those who want all three sections in one volume.

In brief, we have solved our production problem by getting away from the thick volumes which took so much time in process, cost too much to produce, and were too bulky to handle.

The original idea was to make each book complete—to include everything on the subject. The interest of the average user is now more specialized and our aim is to provide a book service to meet the needs and functions of each principal group in the industry.

Macy's Reported to Be Bootlegging Manuals

Federal Refrigerator Corp.
57 East 25th St., New York City
Sept. 3, 1937.

F. M. Cockrell:

Are you aware of the fact that R. H. Macy of New York City is selling your manuals Nos. 1, 2, and 3 at 88¢ per copy?

If R. H. Macy buy your manuals at a lower price, we should be entitled to the same price, since we sell a great many more than they do, we believe. If on the other hand, they are doing it to break your established price, they should be stopped. All other publishers have stopped Macy from price cutting.

Please clarify your position on this point and oblige. A. I. BRICKNER,
President.

Answer: Macy's have bought none of the new Master Service Manuals from us. Furthermore, a News reporter who visited the store this past week could find no copies on sale in any department.

If it is true that Macy's did sell a few copies at a cut price the books were evidently obtained from a refrigeration supply jobber by over-the-counter purchase.

Note: Another letter just received from Mr. Brickner says: "We were probably a little too hasty in filing this complaint with you, for upon further checking we were unable to get further proof that Macy was selling manuals. In fact we sent one-half dozen different people up there, and so far no one has been able to obtain any."

"The information reached us through some students from the

Home Economists Gaining Hard-Won Recognition

General Electric Co.
Appliance and Merchandise Dept.
Nela Park, Cleveland, Ohio
Aug. 13, 1937

Editor:

Our training schools this summer have surpassed anything we have yet undertaken. The schools have run seven weeks and we have two more weeks to go. To date, we have had 37 different colleges represented, with 42 instructors from the various colleges. Also, we have had about 35 home extension agents, as well as utility and college students. Our total attendance will go well over the 200 mark when the classes are completed.

Although the General Electric Co. has always believed in home service and promoted it; it has taken us nine years to firmly convince our distributors that kitchen equipment is sold to and used by women, and that an home economist, well trained in the uses of the many appliances, is the person who understands the woman's problem, and, with her subtle salesmanship, can merchandise our products, so that the salesman gets the customer's "tattoo" on the dotted line, because the customer has convinced herself the appliance is the one thing she must have in her home that will make for better living, regardless of cost.

The next time you are around Cleveland, come out and see us.

Best personal regards to Mr. Cockrell and to yourself.

EDWINA NOLAN, Manager,
Home Service Section.

Universal Refrigeration & Air Conditioning School, 352 Fourth Ave., New York City, who is one of our best customers and have used the major part of the manuals we have purchased from you. They use your manual as a basis for their course of study, so we owe you an apology for needless excitement."

Coldspot in Norway

McCall Corporation
230 Park Ave., New York City
Aug. 17, 1937

Editor:

I always hesitate to send you any news of foreign matters because you did such a delightful and comprehensive report of the refrigeration business on your travels.

However, last month I was in the department store of Steen & Strom in Oslo, Norway. I expected to see the sales floors littered with "Electrolux" or some other comparable Scandinavian product. Instead I saw the Sears-Roebuck Coldspot on display and thought you might be interested in having the "giveaway" which the store is using.

ARTHUR HIROSE,
Director of Research.

Lost

Gambill Distributing Co.
117 Ninth Ave., South
Nashville, Tenn.

Editor:

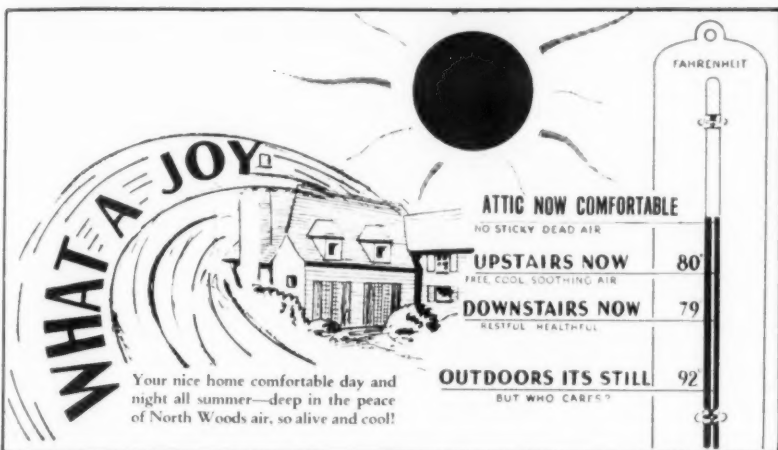
Through some unexplainable manner our subscription to REFRIGERATION NEWS has been allowed to lapse.

I do not know whether this has been caused by our failure to take care of an invoice or just what the reason is—but we are lost without your paper.

Please send at once two or three back issues and get my name on the list without delay.

WHEELS GAMBILL, JR.

An Example of Misleading Attic Fan Promotion That 'Air Age' Contends Has Hurt the Industry



These two illustrations from a colder advertising attic fans are the subject of criticism by Air-Conditioning Editor F. O. Jordan.

THE AIR AGE

BY F. O. JORDAN

The Social Bore and the Attic Fan

No one wants to be a social bore—but probably everyone is one at times if given the opportunity.

A good definition for a bore is a fellow who insists on repeating over and over the thing uppermost in his mind, until you have no opportunity of repeating over and over the thing uppermost in your mind.

Realizing this, it is with the trepidation of an angel fearing to tread where the fools are dashing in, that the writer of this Air Age column plunges more deeply into boredom by again breathing the words "attic fans."

For the benefit of any first-time reader not familiar with the recent controversy carried on in Air Age principally by correspondents, this battle was the result of criticism in this column of exorbitant claims made by certain manufacturers regarding the comfort-making powers of the attic exhaust system.

Sole method of inducing comfort by means of the attic fan is to draw large quantities of outside air in through your living or sleeping quarters, and return it back to the great out-of-doors. This criticism was made in the belief that misrepresentation in advertising is a two-edged sword with no handle, which eventually lacerates all concerned, but none so badly as the swordsman himself.

Doubtless due to the word-clumsiness of the writer certain protagonists of comfort via the attic fan have taken the attitude that his words were written in condemnation of the attic fan.

Nothing is further from the truth.

WHAT ATTIC FANS DO

The truth about the effectiveness of the attic fan toward inducing comfort in the rooms below it, as proved beyond the shadow of a doubt by disinterested research, and as always maintained by Air Age, is that 30 to 60 changes of outside air per hour passed through an average inhabited space will reduce its temperature almost to the out-of-door temperature. That is as far as it can go.

Therefore, the attic fan, if properly installed and if it is of suitable capacity, can maintain continual comfort in your home only when it is comfortable outside.

This does not mean that the attic

fan is not economically justified or that a dealership for a good line of attic fans cannot be a paying one. For there may be millions of potential attic fan addicts to whom comfort even a portion of the time (usually at night) is worth the expense of an attic ventilating system.

In fact, many of such prospects may not well afford the more expensive all-the-time comfort of actual air conditioning by refrigeration, although part-time comfort may be well within their financial reach.

When sold upon the true representation that the attic fan is somewhat lower in cost than real air conditioning, but that it cannot maintain comfort when outside temperature and humidity are too high for comfort the customer is in position to be his own judge as to whether the effectiveness of the attic fan justifies its cost, or whether he prefers and can afford to pay the difference and have positive, every-minute comfort.

CARDS ON THE TABLE?

Under such an air-conditioned atmosphere of truth in advertising, the cards are "all on the table," and both the attic fan and the air-conditioner manufacturers have their rightful quota of satisfied customers as justified by the merits of their respective products. For such customers can then buy with open eyes, and will cheerfully pay for what they get because they have known all the time what they were paying for.

But when certain manufacturers insist on advertising the attic fan as something that can keep you comfortable in every climate, and as a comfort-maker comparable in effectiveness but a great deal cheaper than air conditioning by actual cooling, dehumidifying, and air-cleaning, then rightful customers are stolen away from the air-conditioning manufacturer and dealer. People are misled into buying something which they do not get.

DISAPPOINTED BUYERS

Such buyers in their inevitable disappointment when comfort cannot always be delivered by the attic fan as falsely advertised are liable to be handicaps to further selling in their communities of other attic fans or air conditioners.

Hence the above parable of the two-edged sword without a handle. But why bring that up again?

The cause lies before us now. It was handed to us by a leading

architect with the statement that here was "one for the Ananias Club."

"It" is a folder sent out by a manufacturer who, in common with all manufacturers, is imbued with the laudable desire to merchandise his wares at a profit.

On the front page of this innocent little bit of sales literature is a typical American home shown in the act of sweltering under the terrific burning rays thrown off so freely by the American summer sun.

We are informed by the advertising copy that it is 92° outside this home, that the downstairs temperature is 11° higher than outside, or 103°; that the upstairs temperature is 108°; and that the attic has gone on upstairs (thermally speaking) to 129°. Of course, there may be a two-story home with attic whose first floor temperature could rise 11° above the outside temperature during fruit-canning or bread-baking time, so we may as well pass that range of temperatures up as being possible.

HOW PUBLIC IS MISLED

But turn the page over, and consider what it shows.

Same home.

Same sun.

Same outside temperature of 92°.

The only difference is that now an attic fan has been installed.

For this reason, the attic now is described as being "comfortable" instead of 129°. To be comfortable, it would be necessary for the attic temperature to be reduced considerably below the 92° outside temperature in spite of the same old summer sun, and regardless of the heat carried up from the floors below by the 92° outside air in order to main-

tain the startling temperatures claimed there now.

For the first and second floors now are listed as being 79° and 80° respectively. In other words, the house has been cooled to 79° and 80° by drawing 92° air through it.

The lord and master of this cozy nook now sits, coat on, pipe in mouth, and his hair well curried or groomed. Quite a contrast to his disheveled, uncoated, pipe-less appearance on the front page in the pre-attic fan days.

Says he:

"Do we eat? Do we sleep? Do we enjoy our home in hot weather? In mighty thanksgiving we answer: WE DO!"

TRUE FUNCTION DISTORTED

By showing the same house as having an 11° warmer first floor temperature than the outside temperature when the house is without benefit of attic exhaust fan, but with first floor 13° cooler than outside when provided with an attic fan under identical outside air temperature and sun effect, the circular is very definitely misleading to the layman who is not always adept at recognizing technical impossibilities.

The entire implication of the circular's text is that the house is comfortable for the duration of "hot weather," not merely when outside conditions are comfortable.

Missed completely is the true function of the attic fan, which is to remove the day's sun-heat from the structure so that its interior will be more comfortable at night (when it is more comfortable out-of-doors also than it would be were all of the day's heat permitted to remain in the structure).

Suspended Blower Type

AIR CONDITIONING UNIT



This McQUAY Unit cools, dehumidifies, filters, and circulates the air in Summer; or is designed to heat, humidify, filter, and circulate the air in the Winter . . . Precision built, skillful engineering . . . Designed for Air Conditioning stores, offices, cafes, theaters, shops, etc. . . . Furnished also in floor type.

An interesting descriptive bulletin is available.

WRITE for New Catalogs on McQUAY Unit Coolers, Comfort Coolers, Cabinet Concealed Radiation, Refrigeration Coils, Ice Cube Makers, Air Conditioning Coils, Blast Coils, Combination Heating and Cooling Units, Suspended and Floor Type Blower Coolers, Cabinet Floor Type Room Coolers, Etc.

McQUAY INC.
MINNEAPOLIS MINNESOTA

Plenty of power, but no hum.

Free operation . . . strong kick-off spring.

Needle and seat non-magnetic and non-corrosive.

Durable . . . maximum wear resistance.

Body, special brass casting same as used in expansion valves.

Orifice sizes $\frac{3}{16}$, $\frac{7}{32}$, $\frac{1}{2}$ and $\frac{5}{8}$.

Supplied with female pipe threads, S. A. E. Fittings or sweat connection with New Flange and Tail Pipe Assembly.

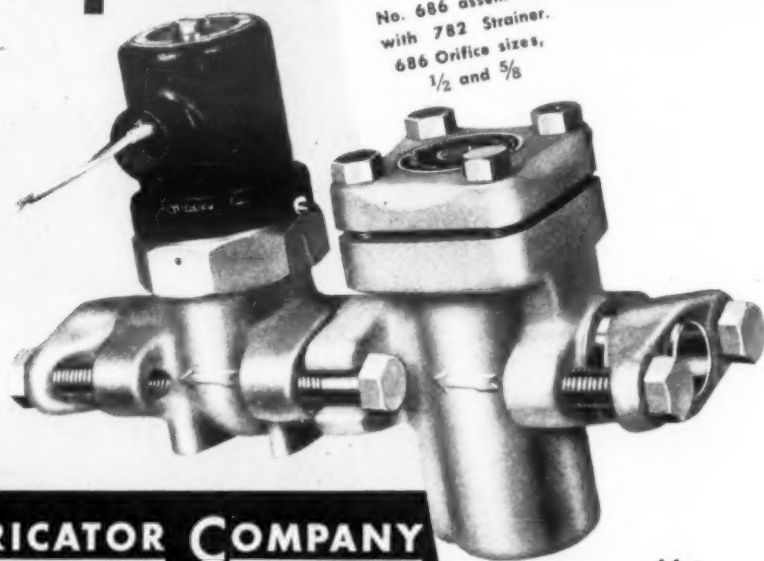
Easier to install . . . more flexible.

Cheaper to stock . . . fewer items needed.

DETROIT SOLENOIDS



Interchangeable Flange and Tail Pipe



No. 686 assembled with 782 Strainer. 686 Orifice sizes, $\frac{1}{2}$ and $\frac{5}{8}$

DETROIT LUBRICATOR COMPANY

DETROIT, MICHIGAN, U. S. A. • 5900 TRUMBULL AVE.

NEW YORK, N. Y.—40 WEST 40TH ST. • CHICAGO, ILL.—816 S. Michigan Ave.

DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

Canadian Representative—RAILWAY AND ENGINEERING SPECIALTIES LIMITED, Montreal, Toronto, Winnipeg

Write
FOR DESCRIPTIVE BULLETINS

SELLING ELECTRIC RANGES

5-Year Service Warranty, Free Installation Featured Kansas City August Range Drive

KANSAS CITY—In cooperation with 23 Kansas City electric range dealers, the Electric Association of Kansas City put on a "Dog Days Special" campaign on electric ranges from Aug. 1 to Sept. 4, modeled along lines similar to the three-month drive staged last spring.

Special bonuses for salesmen and an additional bonus campaign for non-selling employees who turned in prospects who buy within 90 days were features of the campaign.

Other inducements offered prospective purchasers included free installation, the free service of a home economist in teaching proper use of the appliance, a free set of cooking utensils, five-year service warranty at no cost to the purchaser, and a five-year finance plan payable in monthly instalments with the electric bill.

To induce salesmen to "hit the ball" during the drive, the association offered a bonus of \$5 on the first range sale, \$7.50 on the second, and \$10 on the third and all additional sales. This was in addition to the regular commission.

For non-selling employees, a bonus of \$5 was offered for the names of

prospects who buy within 90 days after their names are turned in. The employee had to make the first contact with the prospect himself, after which he turned the name over to the Electric Association, who in turn delivered the name to the dealer preferred, or, if no dealer was specified, allocated the cards proportionately among participating dealers.

Only one bonus was paid for each prospect sold, and the first person to file the name at association headquarters got credit if the sale was made. Bonuses applied only to ranges sold for installation on Kansas City Power & Light Co. lines, and were not paid on sales in which an electric range was replaced or on commercial sales to restaurants, hotels, or the like.

To qualify for participation in the drive, a dealer had to be a member of the Electric Association and regularly handle electric ranges. He had to pay his salesmen a commission on range sales equal to that paid on electric refrigerator sales, and had to display at least three ranges on his floor or in his windows.

All ranges sold in the campaign had to be those approved by the

utility company, and a sufficient supply had to be available in the territory for immediate deliveries.

The utility may dispose of returned ranges as used ranges, and may sell new ranges to builders at a discount of 25%, to encourage development of the all-electric kitchen. Dealers might also offer builders this discount, if they desired.

Employees of distributors, dealers, and the utility company might purchase electric ranges at special prices during the drive, the utility agreeing to finance such sales without carrying charges if the paper was guaranteed by the distributor or dealer concerned.

Delivery and service was handled by the utility company at a cost to the dealer of \$10. The service period extends for five years, and does not cover commercial range installations.

On commercial sales, the customer was required to have the wiring done at his own expense, and no utensils, bonus, or home economist service will be given. A charge of \$10 was made for installation and one year's free service.

The five-year finance plan applied only to sales financed through First Bancredit Corp. Monthly payments will be billed to the customer with his electric service bill, and the following terms will be adhered to:

Minimum down payment was \$2. Maximum terms are 60 months, with a carrying charge of 1/2 of 1% per month on the unpaid balance, the monthly payment on the paper for six months from the date of discount, after which their responsibility will terminate. If the range is repossessed within the recourse period, the dealer agreed to accept it from Bancredit Corp.

If the prospect owned an electric refrigerator and wished to finance it and an electric range on the same contract, he might do so provided the refrigerator was purchased prior to May 1, 1937.

Wiring was handled by the utility without expense to the dealer, provided the range buyer's home was served by overhead distribution and the cost did not exceed the company's allowance—\$35 within the city limits and \$26.50 outside the city.

Salesmen's bonuses were paid as ranges were installed, based on the salesman mailing in a signed card to that effect. No bonuses were paid on sales made to replace rental ranges or on commercial sales.

Kitchen Bureau Issues 2nd Edition of Book On Electric Cookery

NEW YORK CITY — National Kitchen Modernizing Bureau will issue a second edition of "Meals Go Modern—Electrically," the handbook of electric cookery, 200,000 copies of which have been distributed to prospects in 40 states and the District of Columbia.

The new issue will be sent to press as soon as advance orders totaling 100,000 copies have been received.

Valuable as a door opener in range campaigns, the booklet has stimulated consumer interest in all types of electrical cookery appliances, and has proven a sales aid in promoting range and small appliance sales, the bureau reports.

Electric Range & Water Heater Sales Hold Up Well in Seattle

SEATTLE—A total of 616 electric ranges and 1,132 electric water heaters were sold by City of Seattle Department of Lighting during the first quarter of 1937. This city claims to have more electric ranges in use than any other city, regardless of size.

Revenues from electric range and heater sales made by the city utility were 60% greater for 1936 than for 1935. Total sales for 1936 were 29,708 ranges and 17,699 water heaters, as compared to 27,834 ranges and 16,280 heaters for the previous year.

Hotpoint Dishwasher Story Told In New Booklet

CHICAGO—A new sound-slide film titled "To Health and Happiness," which tells the Hotpoint electric dishwasher sales story, was recently released by the Edison General Electric Appliance Co.

The film will be shown at distributors, dealers, and salesmen meetings, and before consumer groups in dealers' territories. It was produced under the direction of Frank Denninger, head of dishwasher sales for Hotpoint.

Built-in Kettles Replace Surface Heating Units In New Range Model



Model 100 Electromaster.

(Concluded from Page 1, Column 4)
heating units are concealed and protected, and all the heat is used for cooking only; 2. Top of the range is always clear, even while a meal is in preparation; 3. Added convenience, due to the flexibility of the capacities of the four cooking units.

Model 10, the Electromaster range incorporating the "Vita-Miser" units, is a full-size cabinet model with late type swinging doors. Exterior is finished in porcelain, with the table top section acid-resisting.

Oven is of the "Mono-Unit" type construction, automatic in operation and lighted by a floodlight set in the back wall of the compartment. Interior oven finish is in rustproof porcelain enamel. Storage space is available below the oven itself as well as below the cooking units. One of the compartments has a sliding shelf.

Table-top and back plate are of one-piece construction, and the top is illuminated by a swinging table lamp attached to an upright arm, on which is a built-in electric clock. Switches are located on the back plate, and are of the three-heat bi-rotary type.

Bottom part of the cabinet is recessed, to provide toe space when the housewife is working close to the range.

Shapiro Co. to Distribute Roberts & Manders Ranges

NEWBURGH, N. Y. — Shapiro Sporting Goods Co., appliance distributor, has been named distributor in the mid-Hudson area of the Roberts & Manders line of "Quality" gas and electric ranges. Jack Arnold was appointed range sales manager for the company.

Bundy Tubing Contributes Long Life

By virtue of its great strength and its ability to resist vibration, Bundy Tubing is making a valuable contribution to the service-life and dependability of automobiles, refrigerators, and other mechanisms which play an important part in modern life.

• Bundy Tubing is rolled from copper-coated steel; both inside and outside surfaces are perfectly clean and free from oxides. Uniformity of wall thicknesses is an important quality. Bundy Tubing is furnished in a wide range of sizes either in lengths or completely fabricated. • Quotations will be gladly made from your blueprints or samples.

BUNDY TUBING CO.
DETROIT



Check These Outstanding Features of C-H Refrigeration Control

- ✓ 4 models meet nearly every need
- ✓ Famous C-H overload protection now available for replacement control
- ✓ C-H settings are dependable, stay the way you set them for years
- ✓ All wanted advantages: cold control; defrost position; adjustable temperature and pressure range; each model fits large or small openings; mounts horizontally or vertically; simple connections.



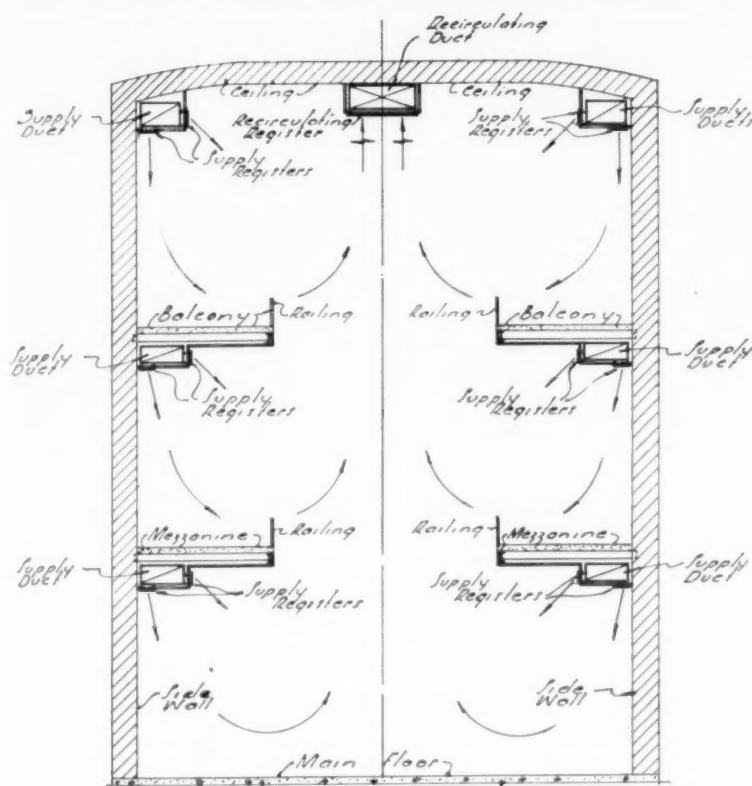
CONDENSERS
COMMERCIAL EVAPORATORS
DOMESTIC EVAPORATORS
COMFORT COOLERS
MARKET COOLERS
AIR CONDITIONING SURFACE
UNIT HEATERS
BLAST HEATING SURFACE

McCord
REFRIGERATION AND
AIR CONDITIONING
PRODUCTS

CATALOGUES ON REQUEST

McCord Radiator & Mfg. Co.
DETROIT, MICHIGAN

Duct System to Assure Even Distribution in Miami Store



The duct system shown above, with air directed downward and outward from ducts just under the mezzanine, the balcony, and the main ceiling, will assure even distribution of conditioned air in the Miami, Fla. Walgreen drug store. As the air is warmed, it rises to the recirculation duct located in the center of the ceiling.

Experience Gained in Cooling 125 Stores
Used as Walgreen Conditions Miami Store

MIAMI, Fla.—Air conditioning installed in the new million dollar drug store to be opened here about Sept. 15 by the Walgreen Drug Co. brings the total number of air-conditioned Walgreen drug stores to approximately 125, and Walgreen's total investment in summer comfort for Walgreen customers to almost three quarters of a million dollars.

Air conditioned Walgreen drug stores are scattered all over the United States, with the heaviest concentration of the air-cooled stores in the humid south and the sun-baked southwest.

In selecting the type of air conditioning to be installed in this mammoth store which represents Walgreen's latest endeavor to provide a cool oasis for its customers, the management was guided by some seven or eight years of experience as owner and operator of a large number of divers types of air-conditioning systems. During this period many systems were tried both of the unit and the central-type, employing as their cooling media both water and refrigerant, as their refrigerants both ammonia and Freon, and as their heat exchangers both spray banks and coil surfaces.

FREON SYSTEM USED

For its new super-store, the Walgreen management has invested \$50,000 in a central system using the direct-expansion Freon cycle with surface-type air-conditioning coils as being best suited in their estimation to this particular application.

The installation is of the all-year type, although it is expected that operation on the cooling cycle will take place during most of the year. All of the functions of air cooling, dehumidifying, heating, humidifying, cleaning, and circulating are included.

It is divided into two separate central systems, one being for the main floor, mezzanine, and balcony, while the other is for the basement—which holds the distinction of being the first merchandising basement in this tidewater city.

Approximately 25% of the total air circulated is outside air, while

the remainder is recirculated from the conditioned zones, as experience with this type of project and equipment has proven that this proportion of outside air will provide the required ventilation and maintain the proper degree of purity.

Therefore, it has been found unnecessary to go to the expense of conditioning greater proportions of hot and humid outside air. The basement system will circulate a total air quantity of 8,000 c.f.m., while the system for the upper floors is designed to provide a total circulation of 32,000 c.f.m.

DISTRIBUTION PROBLEM

The conditioned air for the basement will be distributed throughout the conditioned area as required by a conventional overhead duct system. However, the main portion of the building which is above grade presents a peculiar problem because it is made up of three different floor levels (the main, the mezzanine, and the balcony floors), all of which are within the same room.

With such an arrangement of floors at different levels which cannot be separated from each other, the danger is that the upper levels will be too warm, while lower levels will be too cold because of the tendency of warmer air to rise, and of colder air to fall.

To prevent this undesirable condition of temperature stratification, the air within the room must be kept in a rapid state of agitation or motion, yet this effect must be accomplished without resulting in perceptible drafts.

For achieving the desired effect, the conditioned air for the portion of the building above ground is distributed by ducts which are installed under the mezzanine, under

the balcony, and along the sides of the main ceiling. These ducts are provided with grilles designed and arranged to direct the conditioned air downward and outward at the proper velocity and direction to obtain draft-free distribution of cooled and dehumidified air evenly over the main, balcony and mezzanine floors.

AIR RECIRCULATION

As the air is vitiated and warmed by its cooling contact with customers and heat producing surfaces, it is quickly drawn upward and away to the recirculating openings and ducts which are located high overhead at the center of the main ceiling, which naturally is the warmest part of the conditioned space. In this way, the natural tendency of warm air to rise is assisted by mechanical circulation in rapidly drawing the warm, vitiated air away from the occupancy zone before it can become objectionable.

With this arrangement, it is felt certain that a pleasant condition of even comfort will be maintained at all times at locations on all floors regardless of their different levels within the same conditioned space, and that the tendency towards stratification at different elevations will be overcome.

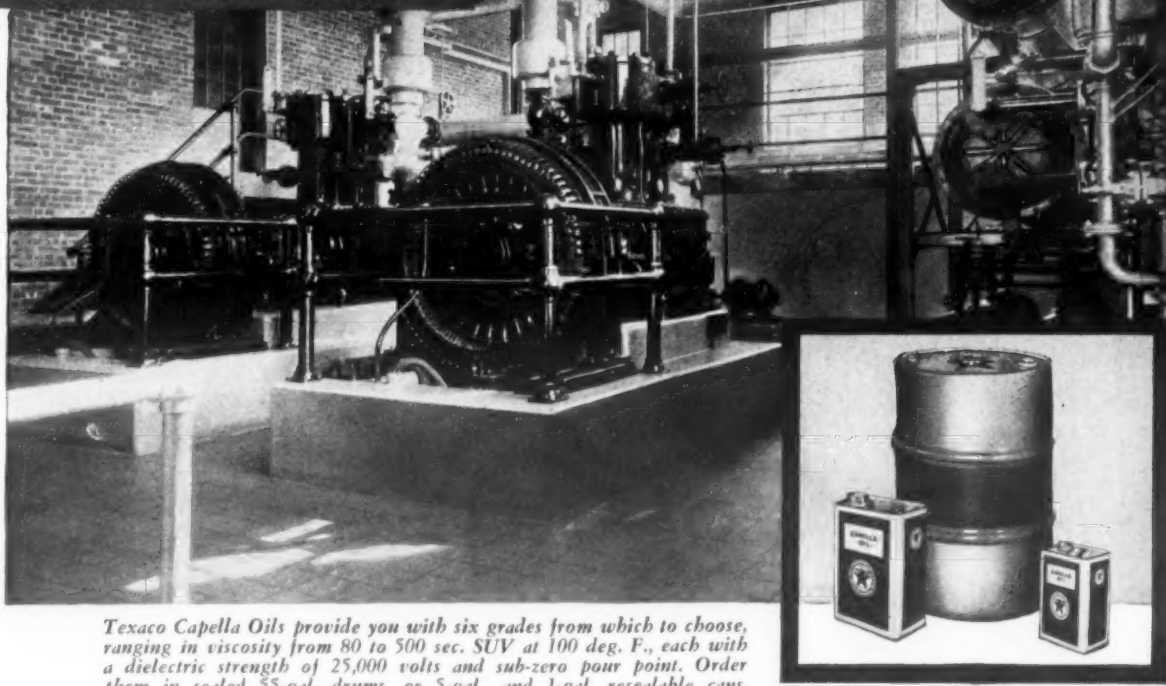
Basis of design for this installation is a 12° differential between outside and inside the building at an outside dry-bulb temperature of 95° F.

One interesting feature regarding the materials used in the fabrication of the equipment is that marine type construction was employed to prevent damage by the salt water which is to be drawn from a well for condensing cooling.

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Air Conditioning Made Easy — By F. O. Jordan

Load Divisions in Estimating Domestic Cooling Load

SECTION NO. 20-A The Domestic Load And Estimate

When estimating the domestic cooling load, there are the same general load divisions as described in Section No. 20, "Field Engineering" in general. These divisions are as follows:

Sensible Loads

- A. Transmission and sun load.
- B. Sensible heat of outside air.
- C. Sensible heat of occupants.
- D. Sensible heat from appliances, lighting, etc.

Latent Loads

- A. Latent heat of outside air.
- B. Latent heat of occupants.
- C. Latent heat from appliances, etc.

Since the general character of these loads has been discussed in detail in the section on "Field Engineering," the present discussion will be confined to methods and peculiarities pertaining to domestic work.

Sensible Loads

A. *Transmission and Sun Load.* Although a more simple method of calculation is described below, these loads may be computed by means of the methods and tables given in Sec-

tion No. 20, as described under transmission, sun effect and "lag."

It must be noted that in the case of the central system project with several rooms which are exposed to sunlight from different directions, the refrigerating load upon the central equipment may not necessarily be as great as indicated by the sum of the maximum loads upon all rooms.

For example, consider east and west rooms which are protected from sun effect from above by rooms above so that maximum sun plus transmission loads come from the east and the west respectively.

If the ducts to the rooms are proportioned to the maximum respective loads upon the rooms, it will be necessary to base the load upon east rooms on morning sun effect on east walls and windows, and to base the load upon west rooms on afternoon sun effect on west walls and windows.

However, these maximum local loads do not occur simultaneously so that they must not be added together in determining the maximum simultaneous refrigeration load upon the equipment. Only sun effect plus transmission should be included for the exposure upon which it is heaviest, while transmission only should be included from other exposures when estimating the total simultaneous load which the equipment will be called upon to carry.

While the domestic load may be computed by means of the methods described, and the tables given in the previous issues, so few basic types of construction are in use in this field that transmission and sunload factors and the effects of lag may be combined into greatly simplified factors for this class of work.

Such factors are shown in Table 30. Such factors when used according to the following directions and explanations will result in a considerable saving of time.

1. To compute the hourly load upon a surface, multiply the area of the surface in square feet by the "heat leakage" factor given in Table 30. Cooling loads will be in B.t.u. per hour. Heating loads will be equivalent duct radiation in square feet.

2. *Heat Leakage* factors in Table 30 are based upon a temperature difference during the cooling season of 15° and during the heating season of 80°, between the outside dry-bulb temperature and the dry-bulb temperature within the conditioned space. For other temperature differentials the factors should be changed proportionately.

3. *Heat Leakage* factors in Table 30 are based upon average good construction. Due allowance must be made in cases where such conditions do not exist.

4. *Cooling Factors* in Table 30 for ceilings immediately under an attic are based upon attic temperatures which generally exist in the un-insulated, unventilated attic at maximum sun effect.

5. Since the sun's rays are very oblique to any wall which they strike during the time of their maximum heating effect upon the attic, and because of the time required for their heat to penetrate the walls, it is unnecessary to use the sun plus transmission factor for any wall when using *heat leakage* factors in estimating the cooling load upon an entire building, or upon a room which is immediately under an attic.

However, the sun plus transmission factor must be included for the windows of the one wall only having the greatest window area unless this is the north wall. If the north wall has the largest window area, use the exposure having the next largest window area. Briefly, this rule becomes:

When estimating the cooling load for an entire building, or for a room which is immediately under the attic, by means of the factors, use only the *transmission only* factor for all surfaces, except for the *windows* of the wall having the greatest window area, except that sun effect should not be included for north exposure. Use the sun plus transmission factor for the *windows* of this one wall only.

6. When estimating the cooling load for a room which is not immediately under an attic by means of the following factors, use the sun plus transmission factor for *only* the exposure whose wall and window load is heaviest. Use the factors for *transmission only* for all other exposures. The reason for this rule is that the effect of the sun's rays cannot be maximum upon two exposures at the same time.

7. Sun plus transmission heat leak-

age factors in Table 30 for the cooling load upon windows and skylights are based upon the use of awnings or inside shades during the period of exposure to the sun's rays. For unprotected glass, the sun plus transmission factor is double the factors given in Table 30.

8. Where "finished rooms" are mentioned, it is assumed that such rooms are not cooled during the cooling season, but are heated during the heating season.

9. Never apply both the factor in column "D" of Table 30 and the factor in column "E" to the same surface, because the factor in column "E" includes both transmission and sun effect.

10. For a building of masonry construction, if the period of occupancy ends at 5 p.m., use the factor in column "D" in preference to the factors in column "E" for the west

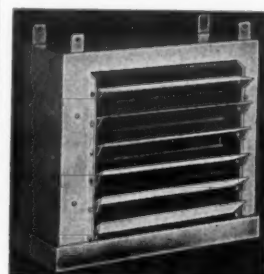
(Concluded on Page 15, Column 1)

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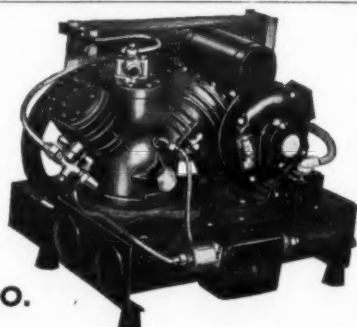
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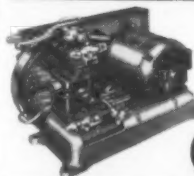
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Table 30—Heat Leakage Factors

A	B	C	D	E	F
No.	Construction	Insulation	Cooling Factors Transmission Only (B.t.u.)	Sun Plus Transmission (B.t.u.)	Heating Factor E.D.R.
1	Brick veneer or frame	None	3.8	8.3	.09
2	Brick veneer or frame	1"	3.0	6.0	.07
3	Brick veneer or frame	3 1/2"	0.9	2.3	.02
4	Solid masonry	None	6.0	12.0	.14
5	Solid masonry	1" and furred	3.8	7.5	.09
6	Solid masonry	3 1/2" and furred	2.3	4.5	.05
7	Masonry against earth	None	0.0	0.0	.05
8	Window	.....	16.5	50.0	.35
9	Skylight	.....	16.5	80.0	.35
10	Interior partition	None	4.2	.....	.07
11	Interior partition	1"	2.0	.....	.04
12	Interior partition	3 1/2"	0.7	.....	.02
13	Ceiling under attic	None	13.5*	.....	.07
14	Ceiling under attic	1"	9.0*	.....	.05
15	Ceiling under attic	3 1/2"	2.7*	.....	.02
16	Ceiling under finished room	None	2.5	.....	.00
17	Floor over finished room	None	2.5	.....	.00
18	Floor over basement	None	0.0	.....	.04
19	Floor over or on ground	None	0.0	.....	.05

*This factor actually includes Sun Effect because it is based upon the high attic temperature which is the result of Sun Effect.

Table 31—Outside Air Factors

(This table is especially prepared for use in connection with residential and office projects whose occupancy does not exceed one person per 25 square feet of floor space.)

Note: Outside air factors are based upon a temperature difference during the cooling season of 15°, and a temperature difference during the heating season of 80°, between the outside dry-bulb temperature and the dry-bulb temperature within the conditioned space. For other temperature differentials, the factors should

be changed proportionately. These tables also are based upon average good construction. Due allowance must be made when other conditions exist.

The following factors when multiplied by the volume of the room or building give the cooling in B.t.u. per Hour, and the heating load in square feet of Equivalent Direct Radiation. The "air change" figures when multiplied by the volume of the room denote the infiltration of outside air per hour.

Exposure	Heating Air Change	Service Factor (E.D.R.)	Cooling Air Change	Service Factor (B.t.u.)
Entire building	1 +	.008	1	.25
Room—No outside door—one wall exposed	.8 +	.007	.8	.20
Room—No outside door—two walls exposed	1.5 +	.011	1.5	.20
Room—No outside door—three walls exposed	2 +	.015	2	.50
Room—No outside door—four walls exposed	2.5 +	.02	2.5	.60
Outside corridor	2.5 +	.02	2.5	.60
Vestibule	4 +	.032	4	1.00

Note: For rooms with outside door, increase factors by 25% to 50%.

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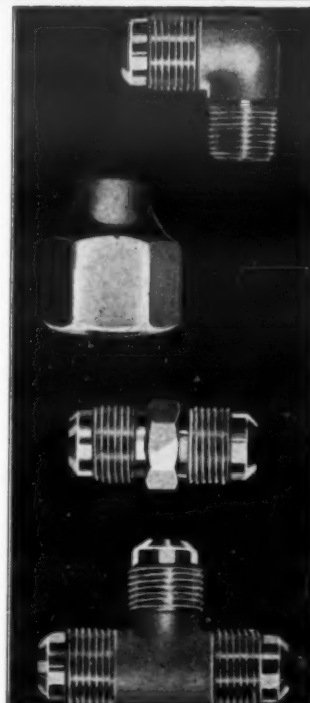
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Learn the Fundamentals Now! Read 'Air Conditioning Made Easy'

Published on this and the preceding page is a continuation of Section 20-A of AIR CONDITIONING MADE EASY, a manual by F. O. Jordan, air-conditioning editor of the News and former head of the air-conditioning development laboratory of the Airtemp division of Chrysler Corp. The book is being published in serial form in the weekly issues of AIR CONDITIONING AND REFRIGERATION NEWS.

AIR CONDITIONING MADE EASY is a manual and textbook on air-conditioning engineering practice. The section continued in this issue—"The Domestic Load and Estimate"—gives an indication of the wide scope of the book. It is a manual which deals not only with the engineering principles of air-conditioning and field application procedure, but also with the actual design of equipment and even the proper organization of personnel for a company getting into the field.

As such, AIR CONDITIONING MADE EASY should be widely useful to individuals already in the air-conditioning field who want to broaden their knowledge of it, to students who are intending to make air conditioning their career, and to executives of manufacturing or distributing organizations who are contemplating getting into the air-conditioning business.

The following instalments of AIR

CONDITIONING MADE EASY have already been published in the News:

What Is Air Conditioning?—Sept. 23.

Section 1, Introduction, and Section 2, Definitions and Simple Thermodynamics—Sept. 30.

Section 3, Coil and Water Cooler Performance—Oct. 7 and 14.

Section 4, Condensing Unit Performance—Oct. 21.

Section 5, Air Movement and Ventilation Requirements—Oct. 28.

Section 6, The Complete Air-Conditioning System for the Cooling Season—Nov. 4, 11, 18, and 25.

Section 7, Heating—Dec. 2, 9, 16, 23, 30, Jan. 6, 13, 20, 27, Feb. 3, 10, 17, 24, March 3, and 10.

Section 10, Don'ts—March 17 and 24.

Section 14, Controls and Zoning—March 31, April 7, 14, and 21.

Section 15, Design of Equipment—April 28, May 5, 12, and 19.

Section 13, Noise Control—May 26 and June 2.

Section 16, Test Data—June 9, 16, 23, 30, July 7, and 14.

Section 20, Field Engineering—July 28, Aug. 4 and 11.

Section 20 (Part 2) Selecting Equipment—Aug. 18, 25, and Sept. 1.

Section 20-A, The Domestic Load and Estimate—Sept. 8.

Types of Sensible Loads to Be Considered In Estimating Domestic Cooling Load

(Concluded from Page 14, Column 5)
wall, but use the "E" factors for west windows.

B. Sensible Outside Air Load. The outside air load consists of the heat which must be removed from the outside air (entering by infiltration) in order to cool it from the outside dry-bulb temperature to the dry-bulb temperature within the conditioned space.

The outside air load may be determined by multiplying the volume of the room or building by the proper factor selected from Table 31, or it may be computed by the methods and tables given in Section 20, "Field Engineering."

If desired, outside air may be allowed to mix with the air entering the air-conditioning unit for delivery to the conditioned space, provided that the amount of outside air so introduced does not exceed that which would enter by natural infiltration, as denoted by Table 31.

This may be done without appreciable increase in load because of the fact that the slight pressure maintained within the conditioned space by the introduction of outside air practically eliminated infiltration.

C. Sensible Occupancy Load. The sensible occupancy load consists of the sensible heat given off by the occupants. The occupancy load in domestic work may be determined by multiplying the number of occupants by 250. When estimating the occupancy it is well to remember that the occupancy upon which the equipment selection should be based is the maximum occupancy which will occur frequently during daylight hours when sun and transmission are at maximum.

Since visitors usually are present at night (daylight visitors generally being too infrequent for consideration), the number of regular residents usually may be taken as the basis of satisfactory and economical design. However, there should be a thorough discussion and understanding upon this point with the customer, for it is his privilege to buy as much air conditioning as he desires.

D. Sensible Appliance Load. (Rarely used in the domestic load.) The appliance load is the heat which is given off by heat-producing appliances and illumination within the conditioned space.

These loads may be read from Table 19.

The load from lighting or from toasters, etc., should not be included unless the lights or appliances are used continuously for more than one-half hour between noon-time and 8 p.m.

Considerable judgment must be exercised in determining the load from kitchen appliances, as all appliances are never in use at the same time, and few of them are in use as much as one hour continuously. The actual

load is determined by considering only the appliances which are used simultaneously between noon and 8 p.m., by multiplying the fraction of a continuous hour which such appliances are in use by the proper factor selected from Table 19.

Since it is not usual in the residence for ranges, etc., to be placed outside the kitchen, and since it is not usual to condition the kitchen because of the high cost of counteracting the heat produced by heavy cooking appliances it is rare, if ever, that heavy cooking appliances need be considered in selecting the air-conditioning equipment for the residence.

If portions of the residence which are adjacent to the kitchen are conditioned, a degree of comfort may be maintained in the kitchen by allowing a portion of the conditioned air to waste through the kitchen, preferably through an exhaust hood over the principal heat-producing appliances.

However, if the kitchen appliances are not included in the estimate, special mention should be made in the guarantee form stating that the guarantee concerning inside conditions to be maintained does not include the kitchen.

Air-Conditioning Courses To Be Given in Boston

BOSTON—Three courses pertaining to air conditioning and electrical engineering will be included among the state university extension courses to be offered during the school year of 1937-38, according to an announcement by James G. Reardon, commissioner of the state university extension department.

"Practical Air Conditioning" will be taught by P. A. L. Foulds, consulting engineer of Hollis French & Co. "Preparatory Courses for Electrician's Examinations" will be given by Henry R. Kurth, and W. Albin Johnson, consultant on oil heating, will offer a course in "Oil Burners."

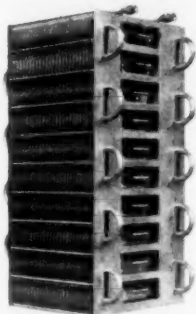
All courses will be held at Massachusetts Institute of Technology, Cambridge.

Carrier to See South African Mine Installation

NEWARK—Willis H. Carrier, chairman of the board of Carrier Corp., sailed aboard the Italian liner Rex, last month, on the first leg of a trip to Johannesburg, South Africa, where he was to inspect the Carrier air-conditioning installation in the Robinson Deep Gold Mine.

Mr. Carrier will collect data to guide North American mine owners in installing air-conditioning systems. He planned to go to Gibraltar on the Rex, and then travel down the west coast of Africa to South Africa.

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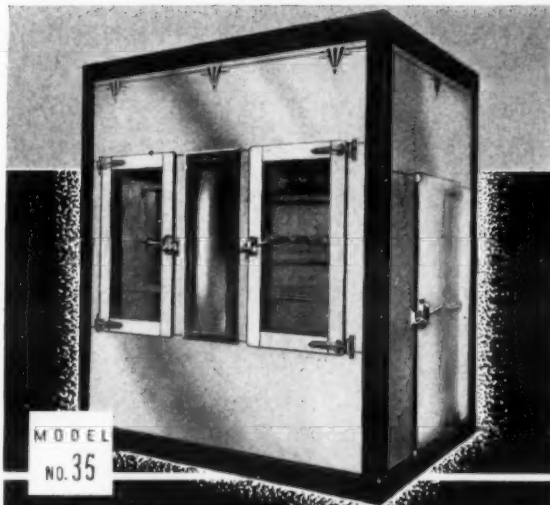
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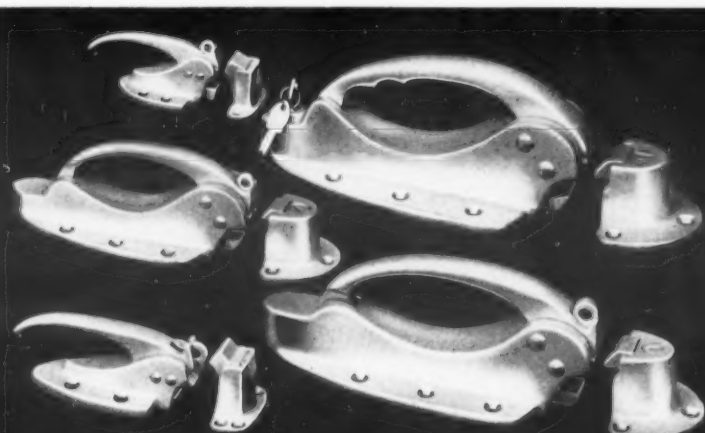
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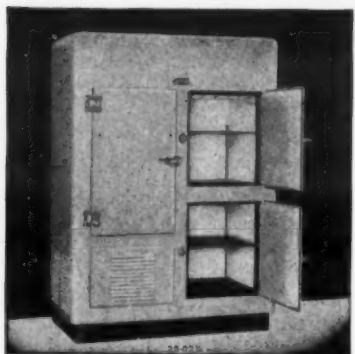
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Commercial Equipment Sales by Nema Manufacturers Drop Off Somewhat to July Total of 25,008 Units

The following report of commercial refrigerating and air-conditioning equipment sales for July, 1937, were made to the Commercial Refrigeration Section of the Refrigeration Division of the National Electrical Manufacturers Association (Nema) by the following 15 companies:

Brunner Manufacturing Co., Carrier Engineering Corp., Crosley Radio Corp., Frigidaire Corp., General Electric Co., Gibson Electric Refrigeration Corp., Kel-

vinator Corp., Leonard Refrigerator Co., Merchant & Evans Co., Norge Corp., Servel, Inc., Uniflow Manufacturing Co., Universal Cooler Corp., Westinghouse Electric & Manufacturing Co., York Ice Machinery Corp.

	Domestic		SALES FOR JULY, 1937		Other Foreign		Total World	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
1. Bottle Water Coolers—Complete.....	997	\$ 67,633	12	\$ 907	46	\$ 3,218	1,055	\$ 71,758
2. Pressure Water Coolers—Complete.....	3,709	371,725	27	2,458	72	6,686	3,808	380,869
3. Water Coolers—Low Side Only.....	280	12,589	.....	.....	15	650	295	13,239
4. Ice Cream Cabinets—Complete.....	3,142	482,469	145	16,594	219	26,728	3,506	525,791
5. Ice Cream Holding Cab. Only (Remote).....	311	41,333	6	859	24	2,781	341	44,973
6. Bottled Beverage Coolers—Complete.....	3,116	279,570	427	19,951	180	15,942	3,723	315,463
7. Milk Cooling Cabinets (No High Sides).....	155	14,529	.....	.....	20	1,339	175	15,868
8. Air Conditioners—Self-Contained.....	1,001	205,258	1	171	53	12,396	1,055	217,825
9. Air Conditioners—Floor Type (No High Sides).....	417	122,867	2	246	43	8,658	462	131,771
10. Air Conditioners—Ceiling Type (Cooling Only—No High Sides).....	359	67,992	3	352	81	10,893	443	79,237
11. Air Conditioners—Ceiling Type (Equipped for Heating—No High Sides).....	49	28,303	1	729	4	2,120	54	31,152
12. Air Conditioners—Residential Type (No High Sides, Boilers, or Furnaces).....	61	17,612	.....	.....	9	4,500	70	22,112
13. Condensing Units—Less Than 1/2 Hp.....	2,780	151,173	18	1,022	264	16,083	3,062	168,279
14. Condensing Units—1/2 Hp.....	2,624	216,850	58	4,679	454	38,070	3,136	259,599
15. Condensing Units—3/4 Hp.....	1,738	178,288	27	3,236	258	28,820	2,023	210,344
16. Condensing Units—1 Hp.....	1,059	148,912	29	4,360	132	19,138	1,220	172,410
17. Condensing Units—1 1/2 Hp.....	806	129,391	14	2,570	46	8,174	866	140,135
18. Condensing Units—2 Hp.....	426	81,424	7	1,563	33	7,029	466	90,016
19. Condensing Units—3 Hp.....	254	61,763	4	1,301	27	7,010	285	69,974
20. Condensing Units—5 Hp.....	217	67,079	3	1,036	36	8,591	256	76,806
21. Condensing Units—7 1/2 Hp.....	179	83,365	1	473	17	6,781	197	89,619
22. Condensing Units—10 Hp.....	79	52,087	.....	.....	2	1,037	81	53,124
23. Condensing Units—15 Hp.....	71	55,687	.....	.....	2	1,645	73	57,332
24. Condensing Units—20 Hp.....	86	72,315	.....	.....	4	3,243	90	75,558
25. Condensing Units—25 Hp.....	42	46,822	.....	.....	1	1,166	43	47,988
26. Condensing Units—30 Hp.....	21	27,229	.....	.....	1	1,420	22	28,649
27. Condensing Units—40 Hp.....	14	25,498	.....	.....	3	4,200	17	29,698
28. Condensing Units—50 Hp.....	13	25,356	.....	.....	9	14,400	22	39,756
29. Condensing Units—60 Hp.....	2	4,328	.....	.....	.....	.....	2	4,328
30. Total—Lines 13 to 29, Inclusive.....	10,411	1,427,567	161	20,141	1,289	165,907	11,861	1,613,615
31. Total—Lines 1, 2, 4, 6, 8, and 30.....	22,376	.....	773	.....	1,859	.....	25,008	.....
32. Commercial Evaporators (Not Reported Above).....	4,391	147,433	205	7,391	1,274	36,065	5,870	190,889
33. Air Conditioning Evaporators (Not Reported Above).....	223	40,703	.....	.....	13	6,850	236	47,553
34. Total Commercial & Air Conditioning.....	.....	\$3,327,583	.....	\$69,799	.....	\$304,733	.....	\$3,702,115

Westinghouse Sponsors Series of 'Merchandise Marts' in New England

SPRINGFIELD, Mass.—Approximately 150 dealers and salesmen from western Massachusetts attended the first of a series of 20 electrical merchandising showings in New England sponsored by the Westinghouse Electric and Mfg. Co., and held in the Kimball hotel here recently.

The "merchandise mart," as it was called, was in charge of J. E. Hall, manager of Westinghouse Electric Supply Co. The mart included the latest in electrical appliances.

Members of the Westinghouse personnel present included: O. I. Alverson, laundry equipment sales department, Mansfield; C. W. Lehner, New England merchandising sales manager, and J. B. Stevenson, New England merchandising sales promotion manager.

Lexington Furniture Co. Adds Appliance Line

LEXINGTON, Ky.—Featuring a complete line of Crosley refrigerators, radios, washing machines, and ironers, an electrical appliance department has been added by Standard Furniture Co. to its store on Short St.

W. W. Greathouse and E. S. Gumm are manager and assistant manager respectively of the new department.

New Dealership Opened In Augusta, Ga.

AUGUSTA, Ga.—The Modern Appliance Co. has opened a retail store here handling household appliances. Members of the firm are Oscar Ray, Ben Moore, and Stanley Grays. Mr. Grays was formerly in business in Chicago.

McNellis, Secretary of Imperial Brass, Dies

CHICAGO — Charles McNellis, secretary of Imperial Brass Mfg. Co., died here Aug. 17 following a brief illness.

Mr. McNellis had been connected with the Imperial organization for 31 years, and headed the company's builder's hardware division.

25 Ryal Salesmen Taken On Mackinac Cruise

DETROIT — Twenty-five salesmen from the seven stores of Ryal's Inc., refrigeration dealer here, were guests of the company on the S. S. South American on her Labor Day weekend cruise from Detroit to Mackinac Island and Sault Sainte Marie.

Winners in Ryal's annual sales contest, the men sailed from Detroit at noon Sept. 4, and returned Sept. 6.

A cruise dance at the Grand Hotel, Mackinac, and entertainments on board ship were features of the three-day cruise.

Columbus Heating Firm Opens Air-Conditioned Building

COLUMBUS—Completely air-conditioned, the \$35,000 office building which Columbus Heating & Ventilating Co. erected adjacent to its recently acquired factory building at 182 N. Yale Ave. here has been completed. The building contains 5,000 sq. ft. of floor space. W. H. Laurer is president of the company.

Nay Holds Pasadena Franchise For G-E Air Conditioning

PASADENA, Calif.—E. O. Nay Co., veteran heating and ventilating contractor, has been named distributor for the complete line of General Electric air-conditioning equipment.

G-E Opens Model Home in Manchester

MANCHESTER, N. H.—Among the firms which had a part in the construction of the General Electric "New American" home, officially opened here recently by Mayor Damase Caron, were G-E Supply Corp., Boston and Manchester, which supplied radial wiring system and supplies; New Hampshire Air Conditioning Co., Manchester, which supplied an oil-burning air-conditioning furnace; and Public Service Co. of New Hampshire which supplied range, refrigerator, and dishwasher.

Display at Wisconsin Fair Yields Several Sales

MILWAUKEE—The display which Taylor Electric Co., Wisconsin distributor for Leonard refrigerators, maintained at the Wisconsin state fair resulted in a considerable number of refrigerator sales, according to P. R. Dye, sales manager.

Radio station WLS, Chicago, chose the Taylor Co.'s booth for the location of a broadcast from the fair. Attendance at the fair approximated 700,000 persons.

Armstrong Folder Describes New Duct Insulation

LANCASTER, Pa.—Armstrong Cork Products Co. has just issued a folder introducing a new type of corkboard specially designed for the insulation of air ducts.

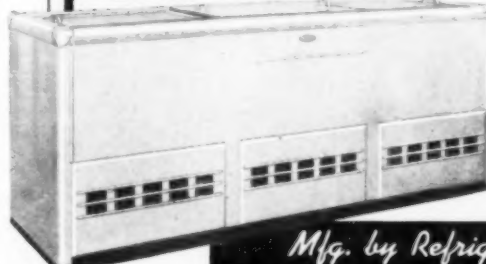
Features of this new type of corkboard are said to be its insulating efficiency, high resistance to moisture, and light weight. It is flexible for easier shaping to the sharp curvatures encountered in duct work.

The insulation can be cut with a sharp knife and applied quickly, the folder states. Directions for applying the corkboard are contained in the folder.

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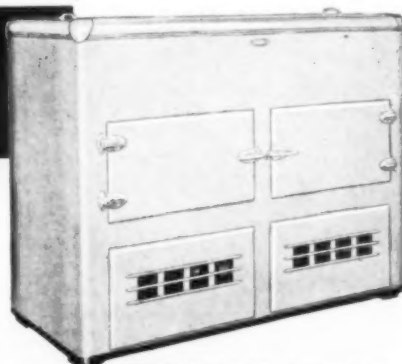


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Investigation of Mayfair Grill Explosion Exonerates Cooling System & Shows Real Causes

To obtain reliable information as to the cause of the explosion, this investigation, made by the Underwriters' Laboratories, was arranged for and financed by Kinetic Chemicals, Inc.

At 12:05 a.m. July 13, 1935, an explosion involving refrigeration equipment occurred in the basement of the Mayfair Grill at 31 East Monroe St., Chicago, Ill. The explosion was not followed by a fire.

Eight men, who were testing the refrigeration equipment for leaks, were burned. One of these men died soon after being taken to a hospital, and another died eight days later.

Several others, having less serious burns, recovered.

This report includes: First, a description of the refrigeration equipment involved in the explosion together with a discussion of the procedure followed in conducting the leakage test prior to the explosion.

Second, a general description of the explosion damage to the refrigeration equipment and the building.

Third, a record of explosion tests conducted to obtain data relating to the cause of the accident—in these tests mixtures of oil and oxygen, solder paste and oxygen, and Freon-12 and oxygen were included.

Fourth, conclusions as to the nature and cause of the explosion.

Refrigeration Equipment

The refrigeration equipment involved in this explosion was new and had not been operated.

It included a refrigeration compressor unit comprising a 3-cylinder, 4 by 4 1/4-in. compressor with water-cooled head, a double water-cooled copper-coil condenser, a 15-hp. d.c. electric motor belted to the compressor flywheel, a liquid refrigerant receiver, and a base on which all these parts together with the controlling devices were mounted.

The cooling units for air conditioning were located in the rooms of the restaurant above, being connected to the compressor unit by copper tubing.

The low-pressure line was a 2-in. outside diameter seamless drawn copper tube with soft-soldered fittings. It was connected to the low-pressure inlet by a soldered valve fitting bolted to the compressor valve plate.

An elbow was soldered into the line at a point about 6 in. from the compressor connection. As the line was 2-in. diameter and the compressor connection was 1 1/2-in. diameter, a reducing coupling was placed in the line between the elbow and the compressor connection.

The body of the valve on the compressor valve plate to which the low-pressure line was attached, was provided with a tapped opening into which had been connected a 1/2-in. copper tube through which the high-pressure gas was admitted for the leakage tests.

It was reported that the refrigerant, Freon-12, was contained in the liquid receiver, the valves of which were closed.

The refrigerant charge, which was reported to be 22 lb., had not been released into the system. It is the practice to ship condensing units from the factory in such condition.

It is also the practice to ship units of this type with the required amount of mineral lubricating oil in the crankcase. This size of unit requires 12 pt. of oil.

A copper tube connected the lower side of the low-pressure inlet fitting to the crankcase of the compressor. This provided a communicating passage into the crankcase for the return drainage of oil carried into the system by the refrigerant vapor circulation, and also provided the necessary equalization of pressure in the crankcase during operation.

Procedure Followed in

Conducting Leakage Test

Following is a description of the leakage test procedure based on statements made by several individuals at the coroner's inquest.

Prior to the explosion the installer of this equipment conducted pressure tests to determine whether or not all joints were gas-tight.

In order to do this a cylinder of high-pressure oxygen was connected by 1/4-in. copper tubing to the previously-mentioned tapped opening in the body of the low-pressure shut-off valve on the compressor.

After all piping joints were completed, the oxygen cylinder valve was opened and the system subjected to a test pressure supposed to have been of the order of 200 lb. per sq. in. (gauge), possibly more.

A slight leak was noted at the low-pressure line elbow previously mentioned. The gas pressure was released, and this elbow removed.

This operation required the use of a soldering torch, the flame being applied directly to the metal of the elbow and adjoining tubing. After removal of this elbow, another one was put in its place, and the joints resoldered.

It is understood that the usual form of soldering paste was employed on the ends of the tubing prior to making up the joints.

The test pressure was again applied. Shortly afterward there was an explosion which wrecked the compressor.

Some witnesses describe two explosions a short time apart. The damage to the equipment and building is described in the following section.

The crankcase of the compressor was wrecked. The wall of this crankcase was 3/8-in. thick. The crankshaft of the compressor dropped or was forced down onto and dented the receiver shell. The welded lug by which the liquid line fitting was connected to the receiver was broken off the shell of the receiver, but the receiver itself was not ruptured by the explosion.

The breaking off of the liquid line, however, caused the release of the refrigerant that was in the receiver. There was evidence of a considerable quantity of oil on the floor beneath the compressor.

The gas cylinder used for the pressure test had been removed from the premises shortly after the explosion, and no direct evidence was available as to the nature of the gas employed.

It was clearly established at the inquest, however, that the cylinder used had contained oxygen.

Whether or not a regulator or reducing valve had been employed at

the cylinder outlet was not established, but the assumption is that such a regulator was attached to the cylinder, as testimony indicated that the cylinder had been brought there for some welding work incidental to building repairs.

Both the man who had connected the cylinder to the compressor and the man who had assisted him had died of burns caused by the explosion.

The explosion pressure developed in the room adjoining the machinery space was sufficient to knock down the hollow tile partition between this room and the next. Other partitions were also damaged, but not as extensively.

The pressure wave propagated through a passageway leading to a sidewalk elevator and forced open the two steel doors in the sidewalk above. A large plate glass window in a drug store next door was broken.

It was reported that the injuries resulting were burns caused by the explosion. All the men injured were working close to the refrigeration machine as the space around it was very small. No one was injured by flying parts or debris.

Explosion Tests

There are a number of oxygen-oil explosions on record and data are available showing that oxygen in contact with lubricating oil when subjected to pressure is capable of spontaneous explosion.

Preliminary Report III entitled "Spontaneous Ignition of Oils in Oxygen under Pressure" by the Bureau of Mines (Serial No. 2555, December, 1923) includes data on determination of ignition temperature of three typical oils—animal (sperm), vegetable (linseed), and mineral (distributed over asbestos free from combustible matter) in oxygen under pressures covering the range from atmospheric to about 3,600 lb. per sq. in.

From these results it appears that for any particular kind of oil the temperature of spontaneous ignition (linseed 120° C, sperm 136° C, and mineral 176° C) is practically constant irrespective of the pressure, but that the force of the explosion is ("in a qualitative sense") proportionate to the charging pressure.

The internal volume of the Bureau of Mines' explosion bomb was about 4 cu. cm. (0.244 cu. in.). Data are not given as to the rate of heating, but this was comparatively slow and probably fairly constant.

It was thought that additional test data as to the influence of the rate of heating on the oxygen-oil ignition temperature, particularly in the case of mineral oil similar to that employed in the refrigeration equipment under examination, would be of value in this investigation, and that it would be also of considerable interest to conduct such tests in a pressure vessel of larger capacity (higher ratio of volume to surface) than the one used by the Bureau of Mines. Oxygen-oil explosion tests, as described later, were therefore included in this investigation.

It was known that the soldering flux in use at the time the leaks in the refrigeration equipment were being repaired prior to the explosion contained combustible matter, and it was decided, therefore, to include samples of a similar flux in the explosion tests with oxygen.

The tests with oxygen-oil and with oxygen-solder paste referred to above are described more in detail below under the heading "Methods of Explosion Tests."

It was reported that Freon-12 was confined to the receiver of the refrigeration equipment at the time

Data Valuable to the Installation Engineer

The explosion in the Mayfair Grill in Chicago more than two years ago (see July 24, 1935 issue of ELECTRIC REFRIGERATION NEWS) which involved refrigeration equipment is no longer news, nor is the established fact that the explosion was due to the heating of oxygen and oil under pressure.

However, the findings of the Underwriters' Laboratories from tests conducted to obtain data relating to the cause of the accident contain information that should add to the knowledge of every refrigeration technician doing installation work. That's why the essential parts are being reprinted.

the explosion in the Mayfair Grill occurred, but the question has been raised as to whether Freon-12 may not have been a direct or a contributing cause of the explosion.

Although it has been demonstrated by previous tests at Underwriters'

Laboratories, Inc., that Freon-12 is nonflammable and non-explosive in air, it was thought that under the circumstances it would be of interest and possible value to include in this investigation tests with mixtures

(Continued on Page 18, Column 1)

THE BUYER'S GUIDE



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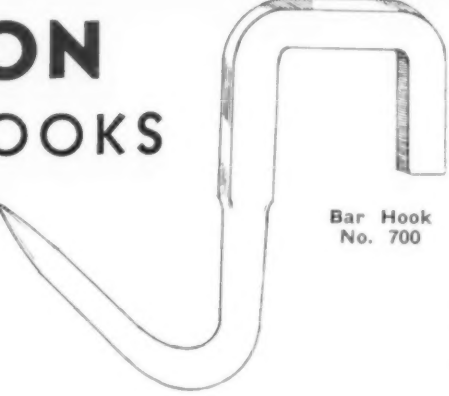


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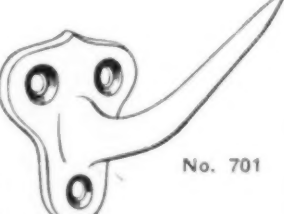
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RANCO, Inc., Columbus, Ohio.

Conditions & Methods Used in Running Explosion Tests & Results Obtained

(Continued from Page 17, Column 5)
containing oxygen and Freon-12, as described more in detail later.

Methods of Explosion Tests

Test Samples—The mineral oil employed in tests with oxygen was similar to that used in refrigeration equipment of the type previously described. The flashing point (Pensky-Martens) of this oil was 165.6° C (330° F.).

The solder paste consisted of a soldering flux in a grease base.

The Freon-12 was obtained from a local commercial source.

The oxygen employed in the tests with mineral oil, solder paste, and Freon-12, respectively, was approximately 99.5 per cent O₂ (electrolytic). It was obtained from a local source of supply.

Test Apparatus—The apparatus employed in the following tests consisted essentially of an explosion vessel, oxygen cylinder with connecting copper tubing, electric heater, and temperature and pressure meas-

uring devices.

The explosion vessel was made of double extra heavy iron pipe fitted at each end with a flange and plate.

The length of this vessel was approximately 4 in. and the inside diameter 2.3 in. The internal volume was approximately 16.6 cu. in. (272 cc). A valve was provided for the introduction of samples of oil.

The explosion vessel was connected to gauges and oxygen supply equipment by heavy-wall copper tubing, 1/2 in. inside diameter, for the introduction and discharge of oxygen.

Both of the intake and discharge tubes were provided with discs designed to rupture at 1800 lb. per sq. in., and also with oil absorbers to prevent oil from being accidentally blown into the valves, gauges, and oxygen supply equipment.

The electric heater consisted of insulated resistance wire wrapped around the explosion vessel. The current was furnished by storage batteries connected in series.

To reduce heat loss, the vessel was heavily insulated with sheet asbestos.

An iron-constantan thermocouple and potentiometer were provided for measuring the temperature of the explosion vessel. The hot junction of the couple was held against one of the end plates of the explosion vessel by a pad of asbestos.

A calibration of this couple was made prior to the explosion tests by comparing readings with those obtained with another couple inserted directly into the oil in the vessel when the latter was heated. All gauges were previously calibrated.

Test Procedure Oxygen-Oil and Oxygen-Solder Paste—A measured volume of mineral oil was introduced into the explosion vessel. In tests Nos. 1 and 2 the air in the explosion vessel was then displaced by oxygen.

In the other tests the explosion vessel was heated to a predetermined temperature before the air was displaced by oxygen (see Table 1).

Finally, in all the tests the oxygen pressure was raised to a predetermined level (see Table 1), and the heating of the explosion vessel continued until its temperature was raised to about 200° C., or an explosion occurred.

In the tests with solder paste the explosion vessel was first heated to a temperature of 100° C. (212° F.), and the sample of melted solder paste introduced, after which the test was conducted as described in the preceding paragraph.

Test Procedure Oxygen-Freon-12—The purpose of the following test procedure was to determine whether any appreciable chemical reaction between Freon-12 and oxygen may occur even in the presence of an electric spark at the temperatures and pressures employed.

It was therefore important to observe whether any pressure change other than that from the expansion of the heated gas occurred, particularly when the mixtures of Freon-12 and oxygen were sparked.

It is recognized that the pressure rise from heating a gaseous mixture at constant volume may be calculated from the gas laws. Owing, however, to the form of the test equipment employed, including the connecting pipe, such calculation would be difficult.

A preliminary pressure test with nitrogen was therefore conducted.

For the tests with Freon-12 the explosion vessel was provided with a spark plug. The sample of Freon-12 was passed through the explosion vessel until the air was displaced.

The valves in the discharge pipe were then closed, after which the pressure of the Freon-12 was raised to a predetermined level.

Oxygen was then introduced until the total pressure of the test mixture in the explosion vessel was high enough to give the required volume composition.

First, an electric spark from the secondary of an induction coil was produced in the oxygen-Freon-12 mixture prepared as described above, and the gauge connecting with the explosion vessel observed to determine whether any change in the pressure of the mixture resulted.

Second, the explosion vessel containing the oxygen-Freon-12 mixture was progressively heated to predetermined temperatures, and the resulting pressures compared with the pressures previously obtained at the corresponding temperatures in a preliminary test using the same explosion vessel filled with nitrogen. At intervals during the heating test

an electric spark from the secondary of an induction coil was again produced in the oxygen-Freon-12 mixtures, and the gauge read to determine whether any change in the pressure of the mixtures occurred.

Third, the residual Freon-12-oxygen mixture removed from the explosion vessel after the heating and sparking test was examined and analytical tests conducted for the presence of oxides of carbon and decomposition products.

Fourth, preliminary analytical tests showed that it would be difficult to make a complete and satisfactory quantitative analysis for the residual gases without a large expenditure of time. It was therefore decided to condense the residual gaseous mixtures using liquid nitrogen, and determine their vapor pressure for comparison with the vapor pressure of samples of Freon-12 which had not been subjected to higher temperatures under pressure in the presence of oxygen.

It is recognized that the test procedure referred to above will not necessarily disclose small chemical changes which may occur in the oxygen-Freon-12 mixture under the conditions employed, but it is evident that such a test procedure will reveal with certainty the occurrence of chemical reactions between the oxygen and Freon-12 which are likely to lead to an explosion or any dangerous or sudden increase in pressure.

Results of Explosion Tests

Oxygen-Oil—The results of the tests with mineral oil and oxygen are shown in Table 1 following.

It is to be noted that although the tests were conducted in an explosion vessel of much larger capacity than the one used by the Bureau of Mines in tests with oxygen in oil, the results appear to confirm the findings of the Bureau of Mines that the temperature of spontaneous ignition of mineral oil is not appreciably affected by the charging pressure (within the pressure range employed), but that the force or violence of the explosion is apparently proportional to the initial pressure.

Comparison of our data with those of the Bureau of Mines indicates that the volume of the test vessel does not influence the temperature of ignition of oil in oxygen.

It is of interest to note that in tests Nos. 1 and 2 (see Table 1), in which the explosion vessel was heated very slowly, its initial temperature being comparatively low, no explosion occurred although the oil was oxidized.

It has been, therefore, apparently brought out by our tests that a slow rate of heating of mineral oil in oxygen under certain conditions, even at comparatively high charging pressures, may cause slow oxidation of the oil without producing an explosion.

It appears that further research to determine more definitely what effect the rate of heating has on the spontaneous explosion of oil in oxygen, would be of interest and of practical value.

Oxygen-Solder Paste—Only one test with solder paste was conducted, and the result is included in Table I. It is to be noted that the temperature of ignition of the paste was somewhat higher than that of mineral oil.

Oxygen-Freon-12—It appears from the test data, that on heating samples of Freon-12 in admixture with oxygen under pressure, no appreciable chemical combination or decomposition occurred except in test No. 1 in which moisture was present.

In the latter case there was some decomposition of Freon-12 as evidenced by a small pressure rise beginning at a temperature of about 50° C. (122° F.), and by the white fumes (hydrochloric and hydrofluoric acids) observed in the gases discharged from the explosion vessel after the test.

However, both the pressure increase and the rate of rise of pressure in this test were small.

Further, there was no evidence of any increase of pressure on sparking the heated oxygen-Freon-12 mixtures when under pressure.

The residual gases removed from the explosion vessel at the conclusion of the heating and pressure tests except those in which moisture was present were found to be free from the odors of hydrochloric and hydrofluoric acids, and of phosgene (decomposition products). No fumes

(Concluded on Page 19, Column 1)

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COMMERCIAL DEALERS to sell our complete line of display cases, refrigerators, walk-in coolers, etc. We manufacture equipment of all sizes. Sell with your present line of machines or with our line of compressors if desired. Attractive dealer's discount with financing arrangement for your sales. Write for full information. H. EHRLICH & SONS MFG. CO., Station D, St. Joseph, Mo.

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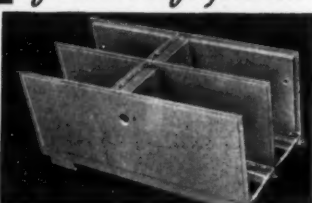
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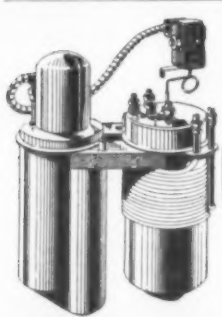
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Heating of Oxygen & Oil Mixture Caused Mayfair Explosion, Tests Reveal

(Concluded from Page 18, Column 4)
were observed on contact of the residual gases with the air.

The results of tests of the residual gases for oxides of carbon are as follows:

Test No.	Carbon Monoxide Per Cent By Volume	Carbon Dioxide Per Cent By Volume
5	2.4	0.7
6	0.3	0.3

The results of the above tests, including the pressure and sparking tests at elevated temperatures with Freon-12 in the presence of oxygen, the analytic tests of the residual gases after heating under pressure with oxygen, and finally the vapor pressure tests of the condensed residual gases from the pressure tests with oxygen, show no evidence of any appreciable chemical action between the oxygen and Freon-12 except as noted in the test in which moisture was present.

While there was some chemical action between moisture and Freon-12, the pressure rise was slow and comparatively small.

Conclusions

Nature of the Explosion—That the forces developed by the explosion which wrecked the refrigeration equipment were comparatively severe is clear from consideration of the nature of the damage to the cylinder heads, the water jacket, and the crankcase.

The evidence further shows that flame was projected from the ruptured equipment when the explosion occurred.

Rupture of the equipment from excess gaseous pressure alone would probably have been confined to the crankcase under the circumstances, and would not have caused the mechanical and other effects noted.

The absence of localized and marked shattering effects indicates that the forces exerted were not of a percussive character which would be developed by the detonation of a high explosive such as dynamite, nitroglycerin, blasting gelatin, or gun cotton.

It appears, therefore, that the rupture of the refrigeration equipment was caused by sudden pressure such

Table 1—Results of Oxygen-Oil and Oxygen-Solder Paste Explosion Tests

Test No.	Volume of Oil cc	Oxygen Test Pressure Lb. Per Sq. In. Gauge	Initial Temperature C	Initial Temperature F	Average Rate of Rise of Temperature Per Minute C	Average Rate of Rise of Temperature Per Minute F	Maximum Pressure and Temperature Before Explosion		Duration of Test Min.	Effects of Explosion		
							Lb. Per Sq. In. Gauge	C	F	Discs	Copper Tubing	Explosion Vessel
1	80	190	8.0	46.4	1.9	3.4	190	199.0	390.2	101	No Explosion*	No Explosion*
2	80	205	7.0	44.6	1.9	3.4	205	203.0	397.4	105	No Explosion*	No Explosion*
3	20	300	160.0	320.0	3.3	6.0	300	170.0	338.0	3	Ruptured	Ruptured
4	17	645	135.0	275.0	2.4	4.4	645	152.0	305.6	7	Ruptured	Intact
5	15	1100	158.0	316.4	2.0	3.6	1100	164.0	327.2	3	Ruptured	Ruptured
6	15†	460	97.0	206.6	2.2	4.0	460	203.0	397.4	48	Ruptured	Intact

*The oil had darkened, and the gases released from the vessel at the close of the test contained carbon dioxide, carbon monoxide, alcohol vapor, and gases absorbed by bromine. See results.

†Solder paste was used in this test

as would be produced by ignition of a combustible gas or oil in the presence of sufficient oxygen.

The damage to the partitions adjoining the space occupied by the refrigeration equipment was evidently caused by pressure waves propagated through a passageway leading to a sidewalk elevator, which were of sufficient force to cause structural damage at some distance from the place where the explosion in the refrigeration equipment occurred.

It would be difficult to account for all the explosion damage mentioned above on the basis of pressure effect developed by a localized explosion in the refrigeration equipment. It therefore appears probable that a secondary gaseous explosion followed the explosion in the refrigeration equipment.

Cause of explosions—The evidence indicates that at the time of the explosions, oxygen was being employed by the workmen in tests for a leak in the refrigeration system, parts of which had been heated.

It will be noted from Table I that in explosion tests Nos. 1 and 2 in which the initial temperature (44.6° to 46.4° F.) was below room temperature (about 70° F.), and a comparatively slow rate of heating was employed, no explosions occurred.

In all the other oxygen-oil tests, however, in which the maximum temperature to which the explosion vessel was heated was of a lower order than that employed in soldering operations, explosions of the oil-oxygen mixtures, resulted.

It has been shown that Freon-12 was confined to the receiver at the time of the explosion, and that the receiver was not distorted or ruptured. Furthermore, it has been shown that if Freon-12 were present in the refrigeration system, it would not even in the presence of oxygen, regardless of whether moisture was present, be capable of developing a sudden pressure or explode when exposed to heat and sparks.

It appears from the foregoing that the explosion in the refrigeration equipment was caused by the heating of oxygen and oil under pressure.

It will be noted that an acetylene cylinder was being employed by the workmen at the time of the explosion, and it appears probable that acetylene gas leaked into the room, and was ignited by the explosion in the refrigeration equipment.

Respectfully submitted,

A. H. NUCKOLLS,
Chemical Engineer.
SYDNEY V. JAMES,
Mechanical Engineer.

Emerson Moves Cincinnati Office to New Location

CINCINNATI—The local office of Emerson Electric Mfg. Co. has been moved to 457 E. 6th St. Warehouse facilities for stocking Emerson-Electric motors are available at the new location. Jack Searls will remain in charge.

150 Delco-Frigidaire Salesmen Attend Springfield Meeting

SPRINGFIELD, Mass.—About 150 Delco-Frigidaire salesmen of this territory attended a meeting at the Highland hotel here Aug. 18. The meeting was sponsored by Swett Bros. Heating & Appliance Co.

Toussaint Puts Trane System in Madison Apartment

MADISON, Wis.—A. M. Toussaint, Inc. is installing Trane air conditioning in the Quisling apartment building, which when completed will contain 26 regular and three penthouse apartments.

Radio Studios Conditioned

LEXINGTON, Ky.—The studios of station WLAP here have been equipped with Frigidaire air-conditioning equipment, installed by Glenn & Co.

New Firm Enters Columbus Air-Conditioning Field

COLUMBUS, Ohio — Cooling & Heating, Inc. has entered the air-conditioning field here. Officers are Dewitt H. Wyatt, president and general manager; Herman Trefflich, secretary and treasurer; R. Glenn Osborn, vice president; and Victor J. Cardosi, director and sales manager.

Fort Worth Store to Install Air Conditioning System

FORT WORTH, Tex. — General Engineering Corp. has been awarded a \$160,000 contract for air conditioning W. C. Stripling Co.'s store here.

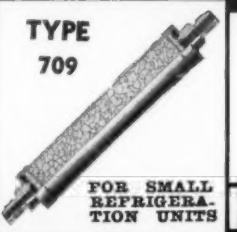
G-E Air Conditioning Dealer in New Haven Moves Store

NEW HAVEN, Conn.—Automatic Appliance Corp., handling General Electric air-conditioning equipment, gas and oil furnaces, and G-E appliances, has moved its showroom and office from 1088 Chapel St. to larger quarters at 54 Whitney Ave. T. F. Chalkiadi is manager.

Pattinson to Equip Theater at Hutchinson, Kan.

HUTCHINSON, Kan. — Pattinson Electric Co. has contracted to handle air conditioning of the State theater office here.

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